

AN ANALYSIS OF THE EFFECT OF INTEGRATION
ON THE PRIVATE PENSION TAX SUBSIDY

BY

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Abstract of Dissertation Presented to the Graduate Council
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AN ANALYSIS OF THE EFFECT OF INTEGRATION
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The government currently subsidizes the private pension system. Employer pension plan contributions and the interest they accrue go untaxed until received by the employee, while the employer gets a current tax deduction. Generally, for a private pension plan to qualify for the pension tax subsidy it must provide benefits proportional to wage income for all classes of employees. However, an employer can elect to integrate his pension plan and it will remain subsidized if the benefits it provides, when combined with the Social Security benefits deemed purchased by the payroll taxes imposed on the employer, are proportional to employee wages.

The purpose of this study is to determine the effectiveness of the current integrated private pension tax

subsidy in providing adequate retirement income to all classes of workers. Effectiveness is determined by comparing the current integrated subsidy to three benchmarks. One is a tax subsidy that is proportional to wage income. The second benchmark is a modified integrated tax subsidy proposed by President Carter in 1978. The final benchmark is a subsidy designed to provide enough private pension retirement income that when combined with a retiree's other sources of income will enable him or her to maintain a preretirement standard of living.

These comparisons are made using an empirical based microsimulation model. Actual integrated and nonintegrated pension plan benefit formulas are programmed into the model. The actual integrated plans also are converted to plans that are proportional to wage income and plans that would meet the 1978 proposal. Expected pension benefits under these four groups of plans are calculated using profiles of employee characteristics based on empirical data collected on employees covered by private pension plans. The expected benefits from the four groups of plans are then compared to each other and to the pension benefits necessary to enable retirees to maintain a preretirement standard of living.

The results of this study reveal that the current integrated subsidy does not provide benefits that would fully meet any of the three benchmarks. Low-salaried and median-salaried employees and employees with few years-of-service experience the primary deficiencies.

CHAPTER I

INTRODUCTION

This study will empirically determine the effect of the current integrated pension tax subsidy on benefits provided by private pension plans and compare this effect to three benchmarks. One is a tax subsidy that is proportional to wage income. This benchmark is used because it was the initial design intended by Congress when the original pension tax subsidy was enacted in the early 1940s.¹ The second benchmark is a modified integrated tax subsidy proposed by President Carter in 1978.² The final benchmark is one frequently found in the economics literature³ and one that has surfaced repeatedly during the recent Congressional testimony on pensions and aging.⁴ It is a subsidy designed to provide enough private pension retirement income so a retiree's total retirement income (composed of Social Security, private assets, and private pensions) is sufficient to enable him or her to maintain a preretirement standard of living.

The choice of the appropriate benchmark is a social policy decision for Congress to make. They are our nation's accepted social choice mechanism for tax policy. The results of this study, however, should help provide useful input for the decision-making process.

Significance of the Problem

The issue of whether reform is needed for our current pension tax subsidy is particularly important at this time. In 1960, only about 8 percent of the population was sixty-five years of age or older.⁵ Today, the elderly represent about 11 percent of all Americans,⁶ and by the early part of the next century this group is expected to constitute approximately 20 percent of the population.⁷ In addition, the longer life expectancy has resulted in a higher percentage of the population reaching the normal retirement age of sixty-five and collecting benefits well beyond that point. In 1900, 29 percent of the elderly population was over seventy-five,⁸ whereas by 1970, that proportion had risen to 39 percent.⁹ By the year 2000, it is expected to be 43 percent.¹⁰ Concurrent with this increase in the number of retired workers has been a steady drop in the birthrate. The birthrate is significantly lower today than it was in the 1960s and well below the 2.1 children per family needed to sustain the present population level.¹¹

The combination of increased longevity and a low birthrate means that when the large postwar "baby boom" generation begins retiring in the year 2010, there will be proportionately fewer workers financing the retirement benefits of a larger elderly population. At the present time, there are thirty Social Security beneficiaries for every one hundred workers.¹² By 2025, there will be about

forty-four beneficiaries per one hundred workers if one assumes that the optimistic economic and demographic assumptions concerning increased birthrate and very rapid economic growth that were included in the 1981 Social Security Trustees Annual Report¹³ are correct. However, if one assumes that the more pessimistic assumptions, of a continuation of present birthrates and 2 to 3 percent annual growth in real gross national product, contained in the report are correct, there will be sixty-five Social Security beneficiaries for every one hundred workers by the year 2025.¹⁴ Thus, assuming no significant increase in the labor force participation rate of the elderly, the dependency ratio of the aged to the active labor force could more than double.¹⁵

The cost of continuing to provide a substantial portion of retirement income through the Social Security system is staggering. In 1977, Congress was forced to pass a significant tax increase to finance the next ten years of Social Security needs.¹⁶ Despite this increase, in order to insure the continued future viability of the Social Security system major increases were again passed by Congress in 1983.¹⁷ Presently the tax rate is scheduled to rise to 7.65 percent each for both the employer and employee by 1990.¹⁸ This rate is applied to wages below a ceiling referred to as the taxable wage base. This base is scheduled to rise each year, from its present level of \$35,700, in accordance with future increases in the consumer price index.¹⁹ According

to the Social Security Administration's present estimates, combined employee/employer Social Security tax rates in the year 2050 could be 25 percent of the taxable wage base, or as high as 45 percent if economic growth is modest and demographic developments are unfavorable.²⁰ As a result of these drastic increases in current and projected costs, the nation's confidence in the continued viability of the Social Security system has been seriously undermined. A 1981 public opinion survey found that 73 percent of those between the ages of twenty-five and forty-four have little or no faith that funds will be available to pay their Social Security benefits.²¹

Providing retirement income for the current and future elderly population has become a national concern. In 1978, a Presidential Commission was appointed to review our national retirement policy. The Commission's major objective was to insure that today's retirees and tomorrow's elderly are able to maintain a reasonable standard of living during retirement.²² To achieve this goal, the Commission generally recommended that the Social Security system be gradually brought back to its original designated intention of providing a "minimum floor of protection" or "minimum subsistence" that would have to be supplemented by other sources in order to maintain a comfortable standard of living.²³ In 1950, Social Security paid 28 percent of all retirement, disability, and survivor benefits.²⁴ By 1980, Social Security's share had more than doubled, while the

share paid by public and private employee pension plans had decreased.²⁵

The Commission also designated as its highest priority the expansion of private pension plan participation.²⁶ The Commission's specific recommendation of instituting a mandatory minimum universal pension system²⁷ has not been approved by Congress. However, recent Congressional hearings²⁸ reflect an emerging consensus that a balanced retirement income system is necessary in this country and an acceptance of the goal of stimulating expansion of the private pension system. The means of providing this stimulation, however, are as yet unresolved. Hence, a closer look at our current private pension system is in order.

Private pension plans which meet the "qualification" requirements set forth in the Internal Revenue Code currently receive favorable tax treatment. These requirements govern such areas as coverage, benefits, contributions, funding, and vesting.²⁹ The most stringent of the qualification requirements are the nondiscriminatory coverage and benefit standards. The plan must cover either (1) 70 percent or more of all employees, or 80 percent or more of all eligible employees, if 70 percent or more of the employees are in fact eligible, or (2) employees qualifying under a classification scheme found by the Commissioner of the Internal Revenue Service not to be discriminatory in favor of officers or shareholders.³⁰ The nondiscrimination requirements also specify that contributions or benefits

provided by a plan may not discriminate in favor of employees who are officers, shareholders, or highly compensated.³¹

The favorable tax treatment afforded to qualified plans is extensive. Code Section 404(a)(5) specifies that compensation paid to employees under "nonqualified plans" is generally deductible by the employer if the employee's receipt of such compensation is not deferred. However, this matching rule does not apply to qualified pension, profit-sharing, and stock bonus plans. Under Section 404(a)(1) contributions to qualified plans are deductible when made, while under Section 402(a) taxation to the employee is delayed until an actual distribution is made from the plan. Also, Section 501(a) provides that the earnings on funds invested in qualified plans are not taxed until distributed. This tax exemption/tax deduction combination is the primary advantage of qualified pension plan tax treatment. A pension trust may be built up tax-free over a period of many years. In addition, when the contributions and earnings are taxed at retirement, the individual may be entitled to an additional exemption on account of age and may also be in a lower marginal tax bracket. Further tax advantages available for "qualified" pension plan distributions include ten-year averaging for lump sum distributions,³² capital gains rates for benefits accrued before 1974,³³ and an estate tax exclusion of up to \$100,000.³⁴

Although qualified pension plans currently receive favorable tax treatment, the nondiscriminatory coverage and benefit requirements may not ensure that these tax incentives are being fully effective. In 1942, when Congress first enacted qualification requirements, their purpose was to insure that plans would not just cover a small percentage of employees or favor the higher-paid employees or stockholder-employees.³⁵ These requirements were designed to induce high-income taxpayers to save for retirement in such a manner that also provided benefits for rank-and-file employees who are less able to save and also less likely to be induced to do so by tax relief measures.³⁶

However, by 1942 several large plans already existed which were supplementing Social Security benefits by only providing contributions and benefits with respect to wages above the Social Security taxable wage base. Employees whose wages were below the Social Security wage base were excluded from benefiting under these plans. Therefore, so as not to overly disturb the large, existing pension plans which were established before the nondiscrimination requirements, Congress also provided as part of the Revenue Act of 1942³⁷ that employers could take into account the portion of each employee's Social Security benefit considered paid by the employer as a pension benefit in determining whether their private pension plan discriminated in favor of highly compensated employees.³⁸ Such a pension plan was said to be "integrated" with the Social Security

system. Thus, qualified, integrated, private pension plans today can totally eliminate, or reduce proportionately, the benefits of covered employees whose wages are below the Social Security wage base. Alternatively, these plans can subtract a portion of the covered employee's Social Security benefit from their accrued pension benefit and still receive favorable tax treatment. Thus, as a result of integration, any increase in the Social Security system automatically reduces pension plan participation. Raising the taxable wage base raises the wage level below which employers do not have to pay any pension benefits. Similarly, raising the Social Security benefit level increases the amount allowed to be subtracted from an employee's otherwise accrued private pension benefit.

Integration is elective rather than mandatory. Also the integration rules, as discussed in Chapter II, are stated as limits. Any particular pension plan can be integrated to any extent up to these limits. Therefore, we cannot rely exclusively on the law to determine the effect of integration on subsidized pension benefits. This effect must be determined empirically. The only previous empirical studies concerning integration have been surveys of the number of existing plans which are integrated.³⁹ These studies⁴⁰ reveal that approximately 60 percent of all private pension plans in the United States are integrated. Thus, it seems that a large number of pension plans are affected by integration. However, there is still

uncertainty concerning the extent of this effect on subsidized pension benefits.

The integration issue came up repeatedly during the recent hearings held before the President's Commission on Pension Policy⁴¹ and the Subcommittee on Aging.⁴² There was much debate concerning whether reform was needed for our present integration laws. Some individuals and organizations testified that integration was eliminating a large number of rank and file workers from adequate pension plan coverage,⁴³ while others stated that without integration these workers could receive more than 100 percent of their preretirement earnings in combined pension and Social Security payments after retirement.⁴⁴ However, neither side presented any empirical evidence to support their assertions.

Thus, the purpose of this study is to determine the effect of integration on various classes of workers. This study attempts to determine which particular worker classes benefit from the current private pension tax subsidy and to what extent these benefits are allocated to the various worker classes. The degree to which any particular worker class should benefit from the pension tax subsidy is a decision for Congress to make. However, this study should provide a useful input to Congress for their analysis of whether integration tax reform is needed.

Research Methodology

This study will employ an empirically based micro-simulation model to address six research questions. Research question one will determine whether there are any significant identifying characteristics of integrated plans. The characteristics considered are unionization of participants, geographic region, and industry classification.

Research questions two and three address the first benchmark of comparison--a tax subsidy that is proportional to wage income. All nonintegrated pension plan benefits must be proportional to wage income in order to meet the "qualification" requirements.⁴⁵ The expected benefits from existing integrated pension plans, which are proportional to wage income only above a specified wage level (based on either the Social Security taxable wage base or expected Social Security benefits), are first compared to the expected benefits from existing nonintegrated pension plans. This comparison, however, is only a very rough measure of the extent to which integration causes our tax subsidy to deviate from proportionality. There are many different factors beyond whether a plan is integrated or nonintegrated which determine the level of benefits offered. The level of pension benefits offered by a plan may depend on whether the participants are unionized, the region of the country in which the firm is located, the profitability of the industry, and even on the profitability of, and other benefits offered by, the individual company.

Due to the number of these uncontrollable variables, a better measure of the degree to which integration causes our tax subsidy to deviate from proportionality will be derived by converting each integrated plan formula to an "equivalent" nonintegrated formula. Using this method all variables will remain constant between the two groups of plans except whether the benefit formula is integrated or nonintegrated. The differences in benefits expected from these two groups of plan formulas will then be analyzed according to characteristics of workers currently covered by pension plans.

Research questions four and five address the second benchmark of comparison--a modified integrated tax subsidy proposed in 1978.⁴⁶ Again the difference in benefits expected from existing integrated plan formulas and the modified form they would take under the proposal will be analyzed according to characteristics of workers currently covered by pension plans.

Finally, research question six addresses the third benchmark--a tax subsidy which enables a retiree to maintain his or her preretirement standard of living. The amount of retirement income necessary to maintain a retiree's preretirement standard of living is considerably less than 100 percent of preretirement income. First, whereas preretirement earnings are subject to the federal income tax, the Social Security payroll tax, and state and local taxes, a large portion of retirement income is not taxed or is taxed

at reduced rates. Second, work-related expenses such as transportation, clothing, meals purchased away from home, and household services are reduced during retirement. Due to these factors, retirees only require approximately 58 to 80 percent of preretirement income to maintain their preretirement standard of living.⁴⁷ The percentage decreases as preretirement income rises. The possible sources of retirement income are Social Security, private assets, and private pensions. The purpose of research question six will be to estimate the income expected from these three sources for a group of current retirees participating in integrated pension plans and determine whether this income is adequate to maintain their preretirement living standard.

Research Questions

The six research questions addressed in this study are stated as follows:

Research Question 1: Are the following characteristics significantly different among integrated and nonintegrated pension plans--unionization of participants, geographic region, and industry classification?

Research Question 2A: Are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from a random sample of nonintegrated pension plans?

Research Question 2B: Are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from "equivalent" nonintegrated pension plans? If yes, proceed to research question 3.

Research Question 3A: Are there significant differences across industry groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the "equivalent" nonintegrated formulas?

Research Question 3B: Are there significant differences across salary groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the "equivalent" nonintegrated formulas?

Research Question 3C: Are there significant differences across age groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the "equivalent" nonintegrated formulas?

Research Question 3D: Are there significant differences across employment tenure groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the "equivalent" nonintegrated formulas?

Research Question 4A: What proportion of existing integrated pension plans would not fall within the 1978 proposed modified integration limits? If this proportion is greater than zero then proceed to subpart B.

Research Question 4B: Among those integrated pension plans that exceed the modified limits, are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from equivalent-modified-integrated pension plans? If yes, proceed to research question 5.

Research Question 5A: Are there significant differences across industry groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

Research Question 5B: Are there significant differences across salary groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

Research Question 5C: Are there significant differences across age groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

Research Question 5D: Are there significant differences across employment tenure groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

Research Question 6: Are the expected pension benefits provided by the current integrated private pension tax subsidy, when combined with Social Security and private asset income, adequate to maintain a current retiree's preretirement standard of living?

Data

A sample of existing plans was obtained from a computer tape developed from the 1981 Level of Benefits Study done by the Bureau of Labor Statistics⁴⁸ in order to compare the expected benefits from actual integrated pension plans to the three benchmarks. The tape contained information on the benefit structure as well as the following characteristics of 963 private pension plans: unionization of participants, geographic region, and industry classification. Of the 963 plans, 522 were integrated and 441 were nonintegrated. The survey is representative of 21.5 million full-time employees in private sector establishments in the United States, excluding Alaska and Hawaii, which employ at least 50, 100, or 250 workers, depending on the industry. Industrial coverage includes mining; construction; manufacturing; transportation, communications, electric, gas, and sanitary services; wholesale trade; retail trade; finance, insurance, and real estate; and selected services.

The sample of integrated plans was reduced down to a representative subsample of seventy-five plans. Only five of the 522 integrated plans were from the construction industry. Therefore, all five of these were included in the subsample. Ten plans from each of the other seven industries compose the remaining seventy plans in the subsample. A complete explanation of the selection of these ten plans so as to best represent each industry is contained in Chapter IV.

As previously mentioned, the inability to match adequately all of the significant variables affecting the level of benefits a particular plan may offer causes the comparison between actual integrated and actual nonintegrated plans to be very rough. However, a random subsample of seventy-five nonintegrated plans was drawn from the 422 nonintegrated plans included in the Level of Benefits Study.⁴⁹

To capture more accurately the extent to which integration causes our tax subsidy to deviate from proportionality, the actual integrated plans must be converted to equivalent-nonintegrated plans or plans that are proportional to wage income. This conversion is done by assuming that the highest ratio of integrated pension benefits to compensation is maintained. Thus, the highest benefit to compensation ratio will be determined for each one of the seventy-five integrated plans, and that ratio will be applied to all participants of that particular plan in order to determine equivalent nonintegrated benefits.

To compare the current integrated tax subsidy to the 1978 proposed integration limits, the subsample of seventy-five integrated pension plans was examined to determine which benefit structures would have to be modified to comply with this proposal. Twenty-four of the seventy-five plans violated the proposed limits. These formulas were then converted primarily by raising the percentage of benefits paid to workers who earn less than

the integration level or reducing the percentage of the Social Security benefit that is allowed to offset the gross pension benefit. A more detailed explanation of the proposal can be found in Chapter II. Also Table 4.1, pp. 66-70, lists the thirteen general types of integrated pension formulas analyzed in this study and the structures of the corresponding equivalent-nonintegrated and modified-integrated pension formulas. The general types of nonintegrated formulas included in the study are also listed.

To calculate the expected benefits from the above four groups of pension plans empirically based estimates of age, salary level, and employment tenure were developed from Patterns of Worker Coverage by Private Pension Plans, a pension coverage supplement to the 1979 Current Population Survey conducted by the Bureau of Census.⁵⁰ The survey was based on a sampling of 27,253 workers from the same industry classification as the Level of Benefits Study.⁵¹ The sample was reduced down to a subsample of 3,718 employees based on the following criteria: (1) employer has a pension plan, (2) employee works full time, (3) employee works in private industry, (4) employee is not a member of a union, (5) employer employs at least twenty-five other employees, and (6) employee is between the ages of twenty-five and sixty-five. An explanation of the choice of these criteria is included in Chapter IV.

Four ages were focused on to develop profiles of employee characteristics that could be manageably used as input for the microsimulation model. Employees that were twenty-five, thirty-five, fifty, and sixty-years-old in 1979 were selected and sorted by age and annual salary. Next, a low, median, and high 1979 annual salary was calculated for each age and appears below.

<u>Salary Level</u>	<u>Age</u>			
	25	35	50	60
Low	\$ 7,000	\$ 9,000	\$ 9,000	\$ 8,000
Median	11,000	15,000	18,000	15,000
High	21,000	37,000	40,000	42,000

Since these are 1979 annual salary figures and pension benefit formulas are based on compensation at retirement or on average compensation over some time period not exceeding the career length with the firm, these salary ranges had to be projected backwards and forward to generate a lifetime earnings pattern. Thus, each salary level within each age group was projected back to the year that particular age group was twenty-two years of age and forward to the year they would reach sixty-five years of age. These projections were based on real annual income growth rates⁵² and historical changes in the consumer price index developed by the Bureau of Census.^{53,54} In addition, future expected changes in the consumer price index were based on the intermediate assumptions of the 1982 Annual Report of the Social Security Board of Trustees.⁵⁵ A combined list of these sets of growth rates can be found in Table 4.4, p. 89.

The years of service a typical employee could expect to have at retirement were determined by focusing on only those employees within the subsample of 3,718 who were age sixty to sixty-five. Based on the years of service of these 177 workers low, average, and high years of service figures were calculated to be nine, twenty-five, and forty-one years, respectively. Thus, there are thirty-six combinations of age, salary, and years of service at retirement to be inputted into the model for each pension plan analyzed.

A final data source is used to complete the variable specification of the model. As previously mentioned, the calculation of integrated pension benefits may depend on the level of the Social Security taxable wage base at retirement or over some period of an employee's working career, or on the employee's expected primary Social Security benefit at retirement. The projections of future Social Security taxable wage bases are also taken from the 1982 Annual Report of the Social Security Board of Trustees.⁵⁶ These projected wage bases, along with historical Social Security taxable wage bases, appear in Appendix I. The expected Social Security benefits, however, are obtained by using the previously discussed employee profiles as input for a benefit computation computer program developed by the Office of the Actuary of the Social Security Administration.⁵⁷ The same economic assumptions used to project future salary levels and Social Security wage bases are built into this model.

The completely specified microsimulation model then will provide all of the information necessary to compare our current integrated tax subsidy to the first two benchmarks. The output will consist of expected integrated, nonintegrated, equivalent-nonintegrated, and equivalent-modified-integrated benefits which will be used to address research questions two and four. The integrated, equivalent-nonintegrated, and equivalent-modified-integrated benefits can then be identified with and broken down into each of the industry, age, salary, and years-of-service groups analyzed to address research questions three and five.

Finally, research question six is addressed by using the integrated benefits calculated by the model for the sixty-year-old group of employees and their expected Social Security benefits at retirement. Their expected private asset income is based on the results of a 1982 economic study done by Alicia Munnell.⁵⁸

Statistical Tests

Statistical analysis is employed for research questions one through five. Research question one is simply a test of the following statistical hypotheses using the complete sample of 963 actual pension plans.

H_{0A} : The true proportion of integrated plans which are unionized equals the true proportion of nonintegrated plans which are unionized.

H_{1A} : The true proportion of integrated plans which are unionized does not equal the true proportion of nonintegrated plans which are unionized.

H_{0B} : The true proportion of integrated plans located in each geographic region equals the true proportion of nonintegrated plans located in each geographic region.

H_{1B} : The true proportion of integrated plans located in each geographic region does not equal the true proportion of nonintegrated plans located in each geographic region.

H_{0C} : The true proportion of integrated plans within each industry classification equals the true proportion of nonintegrated plans within each industry classification.

H_{1C} : The true proportion of integrated plans within each industry classification does not equal the true proportion of nonintegrated plans within each industry classification.

The test statistic for these hypotheses is distributed approximately normal and calculated as follows:

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p} \hat{q} \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

where

\hat{p}_1 and \hat{p}_2 represent the proportion of integrated and nonintegrated plans, respectively, which exhibit the characteristic being tested,

\hat{p} represents the proportion of plans in the combined integrated and nonintegrated plan sample which exhibit the characteristic being tested,

\hat{q} is $1 - \hat{p}$, and

n_1 and n_2 represent the integrated and nonintegrated plan sample sizes, respectively.

In determining whether the integrated benefits are significantly less than the nonintegrated and equivalent-nonintegrated benefits, as stated in research question two, a t-test is used. The test statistic varies

depending on whether the two samples being tested are independent or related. Since the samples of integrated and nonintegrated benefits are independent, the appropriate t-statistic for testing the significance of the difference between means is

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{(s_1^2/n_1 + s_2^2/n_2)}}$$

where

\bar{x}_1 and \bar{x}_2 represent the means of the two samples,

s_1^2 and s_2^2 represent the variances of the two samples,
and

n_1 and n_2 represent the two sample sizes.

The samples of integrated and equivalent-nonintegrated benefits are related. The appropriate t-statistic for testing the significance of the difference between these two groups is made by applying a single-sample analysis to the difference between the paired measurements. The t-statistic is

$$t = \frac{\bar{d}}{\sqrt{\frac{s_d^2}{n}}}$$

where

\bar{d} is the means of the individual differences between the paired measurements,

s_d^2 is the variance of the individual differences between the paired measurements, and

n equals the number of paired measurements.

Four, one-way analyses of variance are used to analyze the data for research question three. The first analysis compares the differences in the matched benefits and contributions according to the eight industries included in the study treating each industry as a separate factor level. Salary level, age, and years of service are also partitioned into factor levels and run as three separate analyses of variance. The analysis focuses on each factor separately rather than running a four-factor analysis of variance, because the purpose is not to compare the effects of the factors, but rather to compare the effect of the different levels of each factor. Also, one would expect a priori that salary level, age, and years of service would exhibit significant interaction effects. In making the multiple comparisons among the factor levels, Duncan's multiple range procedure⁵⁹ is used to control the overall significance for each family of tests. An explanation of this procedure is included in Chapter V.

In the statistical analysis for research question 4.A., \hat{p} is first determined. It equals the number of existing integrated plans in the subsample which would not fall within the proposed modified integration limits (24) divided by the number of plans in the subsample (75) or .32. This number is an estimate of the true proportion of existing integrated plans that would not meet the proposed limits. The 95 percent confidence interval for this estimated parameter is $.32 \pm .11$ or .21 and .43.

Research questions 4.B. and 5 are then analyzed in the same manner as specified above for research questions 2.B. and 3.

Summary of Chapter Contents

This study is divided into six chapters. Chapter II presents a detailed explanation of the current integration laws along with the 1978 proposed modifications to the law. Numerical examples are included.

Chapter III explores the economic theory behind the integrated private pension tax subsidy. A discussion of previous related research is also included.

A more detailed outline of the research methodology used is presented in Chapter IV. This includes a complete discussion of the empirical data used to build and specify the variables for the microsimulation model.

Chapter V presents the results from the empirically based microsimulation model and the statistical analysis. The current integrated tax subsidy is evaluated by comparison to the three benchmarks.

Finally, Chapter VI summarizes the preceding chapters. The limitations and implications of the study and recommendations for future research are also discussed.

Notes

¹U.S. Congress, Ways and Means Committee, Revenue Bill of 1942, H.R. 7378, 77th Cong., 2d sess., 1942, pp. 50-51.

²U.S. Department of the Treasury, The President's 1978 Tax Program-Detailed Descriptions and Supporting Analyses of the Proposals (Washington, D.C.: U.S. Government Printing Office, 1978) pp. 147-163.

³Robert Clark, The Role of Private Pensions in Maintaining Living Standards in Retirement (Washington, D.C.: National Planning Association, 1977) pp. 5-8.

⁴President's Commission on Pension Policy, Working Papers--Retirement Income Goals (Washington, D.C.: U.S. Government Printing Office, 1980) pp. 1-11.

⁵Committee for Economic Development, Reforming Retirement Policies (New York: Committee for Economic Development, 1981) p. 13.

⁶Ibid.

⁷Ibid.

⁸Ibid., p. 3.

⁹Ibid.

¹⁰Ibid.

¹¹Ibid.

¹²Ibid.

¹³U.S. Department of Health and Human Service, Social Security Administration, 1981 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance Disability Insurance Trust Funds (Washington, D.C.: U.S. Government Printing Office, 1981) pp. 29 and 32.

¹⁴Committee for Economic Development, Reforming Retirement Policies, p. 3.

¹⁵However with continued low birth rates, a significant rise in female participation in the labor force could lessen this dependency ratio somewhat. The later retirement dates enacted in the 1983 Social Security Amendments may lessen this ratio also.

¹⁶ Social Security Amendments of 1977, Public Law No. 95-216, December 20, 1977.

¹⁷ Social Security Amendments of 1983, Public Law No. 98-21, April 20, 1983.

¹⁸ Internal Revenue Code of 1954 Sections 3101 and 3111. The 1954 Code applies to all subsequent I.R.C. references.

¹⁹ Social Security Amendments of 1983, Public Law No. 98-21, April 20, 1983, Act Section 230.

²⁰ Committee for Economic Development, Reforming Retirement Policies, p. 22.

²¹ Daily Report for Executives (May 15, 1981) p. G-5, cited by Committee for Economic Development, Reforming Retirement Policies, p. 21.

²² President's Commission on Pension Policy, Coming of Age: Toward a National Retirement Policy (Washington, D.C.: U.S. Government Printing Office, 1981) p. 10.

²³ Ibid., p. 49.

²⁴ Ibid., p. 16.

²⁵ Ibid.

²⁶ Ibid., p. 11.

²⁷ The minimum universal pension system required a minimum 3 percent of payroll pension contribution by all employers each year.

²⁸ U.S. Congress, Senate Committee on Finance, Report of the President's Commission on Pension Policy. Hearing Before the Subcommittee on Savings, Pensions, and Investment Policy (Washington, D.C.: U.S. Government Printing Office, 1981) p. 2.

²⁹ I.R.C. Section 401(a).

³⁰ I.R.C. Section 410(b)(1).

³¹ I.R.C. Section 401(a)(4).

³² I.R.C. Section 402(e).

³³ I.R.C. Section 402(a)(2).

³⁴ I.R.C. Section 2039.

³⁵U.S. Congress, Ways and Means Committee, Revenue Bill of 1942, H.R. 7378, 77th Cong., 2d sess., 1942, p. 51.

³⁶Testimony by Daniel I. Halperin, Tax Legislative Counsel, Department of the Treasury in U.S. Congress, House, Hearings Before the Subcommittee on Retirement Income and Employment of the Select Committee on Aging (Washington, D.C.: U.S. Government Printing Office, 1978) p. 43.

³⁷Revenue Act of 1942, Public Law No. 753, October 21, 1942.

³⁸I.R.C. Section 401(a)(5).

³⁹These studies are cited and summarized in U.S. Congress, Joint Economic Committee, Social Security and Pensions: Programs of Equity and Security, "Integrated Pension Plans: An Analysis of Earnings Replacement," by Ray Schmitt, Joint Committee Print, Study Paper 8 (Washington, D.C.: U.S. Government Printing Office, 1980) p. 2 and Appendix C.

⁴⁰Ibid.

⁴¹U.S. Congress, Senate Committee on Finance, Report of the President's Commission on Pension Policy. Hearing Before the Subcommittee on Savings, Pensions, and Investment Policy (Washington, D.C.: U.S. Government Printing Office, 1981).

⁴²U.S. Congress, House, Hearings Before the Subcommittee on Retirement Income and Employment of the Select Committee on Aging (Washington, D.C.: U.S. Government Printing Office, 1978).

⁴³Ibid., pp. 43-50.

⁴⁴Ibid., pp. 50-54.

⁴⁵I.R.C. Section 401(a).

⁴⁶U.S. Department of the Treasury, The President's 1978 Tax Program-Detailed Descriptions and Supporting Analyses of the Proposals (Washington, D.C.: U.S. Government Printing Office, 1978) pp. 147-163.

⁴⁷Alicia Munnell, The Economics of Private Pensions (Washington, D.C.: Brookings Institution, 1982) pp. 23-24.

⁴⁸Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).

⁴⁹Ibid.

⁵⁰Daniel J. Beller, Patterns of Worker Coverage by Private Pension Plans (Washington, D.C.: U.S. Department of Labor, 1980).

⁵¹Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).

⁵²U.S. Bureau of the Census, "Illustrative Projections of Money Income Size Distributions for Households: 1980 to 1995," Current Population Reports, Series P-60, No. 123 (Washington, D.C.: U.S. Government Printing Office, 1980) p. 3.

⁵³U.S. Bureau of the Census, Historical Statistics of the U.S., Colonial Times to 1970, Part I (Washington, D.C.: U.S. Government Printing Office, 1975) p. 210.

⁵⁴U.S. Bureau of the Census, Statistical Abstracts of the U.S.: 1981 (Washington, D.C.: U.S. Government Printing Office, 1981) p. 467.

⁵⁵U.S. Department of Health and Human Services, Social Security Administration, 1982 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (Washington, D.C.: U.S. Government Printing Office, 1982).

⁵⁶Ibid.

⁵⁷S. McKay, Computing a Social Security Benefit after the 1977 Admendments (Washington, D.C.: Social Security Administration, 1980).

⁵⁸Munnell, Economics of Private Pensions, pp. 23-24.

⁵⁹Victor Chew, Comparisons Among Treatment Means in an Analysis of Variance (Washington, D.C.: U.S. Department of Agriculture, 1977) pp. 20-22.

CHAPTER II
INTEGRATION METHODS

Qualification Requirements

As discussed in Chapter I, to receive favorable tax treatment--immediate employer deduction and deferred employee taxation--a pension plan must be qualified.¹ The following qualification criteria appear in Internal Revenue Code Section 401(a):

1. The plan must be for the exclusive benefit of the employees and/or their beneficiaries.
2. The sole purpose of the plan must be either to give the employees a share of the employer's profits or to provide them with retirement income.
3. The plan must be a permanent one, made in writing and communicated to the employees.
4. The plan must not discriminate in favor of corporate officers, stockholders, or highly compensated employees.

In addition, Sections 410(a)(1) and 411(a)(2) set forth the participation and vesting requirements for qualification. The plan must permit any employee who is at least twenty-five years old and has had at least one year of service to participate. Also, the plan must meet one of the following three minimum vesting standards: (1) 100 percent vesting after ten years of covered service; (2) gradual

vesting with 25 percent after five years of covered service, increasing by 5 percent annually over the next five years and 10 percent annually for five more years; or (3) gradual vesting with 50 percent attained when the employee's age and years of service total forty-five, increasing by 10 percent annually over the next five years.² Minimum funding standards and limitations on benefits and contributions for qualified plans appear in Sections 412 and 415. Finally, Title II of the Employee Retirement Income Security Act of 1974³ contains additional requirements in the areas of pension administration--including reporting and disclosure and fiduciary responsibility--that must be met for qualification.

Despite the number of qualification standards, the nondiscrimination requirement is the heart of the qualification conditions. It applies to coverage, benefits, and contributions.⁴ In determining whether a plan operates for the benefit of the majority of employees, pension coverage is evaluated according to Section 410(b)(1) either on the basis of certain percentage guidelines or, more commonly, under the so called discretionary rule. The percentage guidelines require that 70 percent or more of all eligible employees or 80 percent or more of the eligible employees (provided that 70 percent of all employees are eligible) be covered by the plan.⁵ Under the discretionary rule the commissioner may approve any classification scheme for the employees that does not discriminate in favor of

officers, shareholders, or highly compensated employees. It is possible, for example, to have a plan for only salaried workers or for workers in a particular division.

Sections 401(a)(4) and (5) combine to determine when plan benefits and contributions are considered discriminatory. The language of Section 401(a)(5) states that a plan will not be deemed to exhibit the forbidden discrimination in favor of officers, shareholders, or highly-compensated employees "merely because the contributions or benefits of or on behalf of the employees under the plan bear a uniform relationship to the total compensation, or the basic or regular rate of compensation, of such employees. . . ." Thus, as a general rule the nondiscrimination standard is met by providing benefits or contributions that are proportional to total compensation.

Section 401(a)(5), however, further provides that a coverage classification is not discriminatory "merely because it excludes employees the whole of whose remuneration constitutes 'wages' under Section 3121(a)(1) (relating to the Federal Insurance Contributions Act)" and that a benefit or contribution provision is not discriminatory "merely because the contributions or benefits based on that part of an employee's remuneration which is excluded from 'wages' by Section 3121(a)(1) differ from the contributions or benefits based on the employee's remuneration not so excluded. . . ." The quoted language is intended to provide that a plan does not exhibit the

forbidden discrimination if the coverage, benefits, and employer contributions of the plan, when combined, with the Social Security benefits deemed purchased by the FICA taxes imposed on the employer, satisfy Sections 410(b) and 401(a)(4). The process of so correlating Social Security and plan benefits has come to be known as integration.

Thus, a qualified, nonintegrated pension plan must provide pension benefits for all eligible employees, regardless of salary level, based on the same retirement formula. This type of plan operates independently of the public retirement system. The fact that employees may receive benefits from Social Security has no effect on the benefits received from the private pension plan. On the other hand, integration allows an employer to base his plan's pension benefit or contribution formula on the total retirement benefits from the private pension and Social Security system available to his retiring employees. Under a properly integrated plan total retirement contributions or benefits are uniformly proportionate to total compensation at all levels. The integrated plan, therefore, can permit the payment of private pension benefits to higher-paid employees without the necessity of making similar payments to lower-paid members of the same classification in order to avoid the loss of the federal tax advantages.

Correlating Private Pension
Plans and Social Security

The Internal Revenue Service holds that if differentiation of private pension benefits is based on the applicability of the Social Security Act, nondiscrimination depends upon whether the total benefits under the plan and under the Social Security Act establish an "integrated and correlated retirement system."⁶

Social Security benefits are financed from the taxes imposed by the Federal Insurance Contributions Act (FICA).⁷ A tax is imposed upon employers, measured as a percentage of compensation of each employee.⁸ A tax of usually an identical amount is imposed upon each employee and is withheld by the employer from the employee's pay.⁹ Presently, the 1983 old-age, survivors, and disability insurance tax rate is 5.4 percent each for employers and employees yielding a combined rate of 10.8 percent.¹⁰ Generally, all remuneration for services constitutes "wages" subject to the FICA tax, except that amounts earned above a certain level are excluded.¹¹ The wages up to this level are generally referred to as the taxable wage base. [See Appendix I, p. 176, for a list of the taxable wage bases in effect since the Social Security Act was first enacted in 1936.]

Through the years the integration requirements have been altered to correspond with changes in Social Security benefits and formulas. The current requirements are

presented in Reg. Sec. 1.401-3(e)(2) and Revenue Ruling 71-446.¹² The great complexity of the integration rules is the result of considerable diversity in qualified pension plans. Some plans operate in a manner similar to Social Security, and in such cases a comparison of plan provisions and Social Security is not difficult. However, other plans are much less easy to compare with Social Security. The approach adopted by the Service has been to develop integration rules for plans which operate similarly to Social Security and then to fashion the integration rules for other plans by comparing the similar plans to less similar plans.

There are two basic types of pension plans--defined benefit plans and defined contribution plans.¹³ Under a defined benefit plan a formula is provided based on compensation, years of service, or a combination of the two for computing the employee's benefit.¹⁴ The employer's contributions are then actuarially determined.¹⁵ For example a plan might specify a monthly benefit equal to \$8 times the number of years of service up to a maximum of forty years of service. Thus, an employee retiring with forty or more years of service would receive a monthly pension of \$320. In contrast, under a defined contribution plan, the employer makes a separate contribution of some stated amount for each participating employee.¹⁶ This amount is usually some percentage of annual compensation. Upon retirement the employee would be entitled to whatever

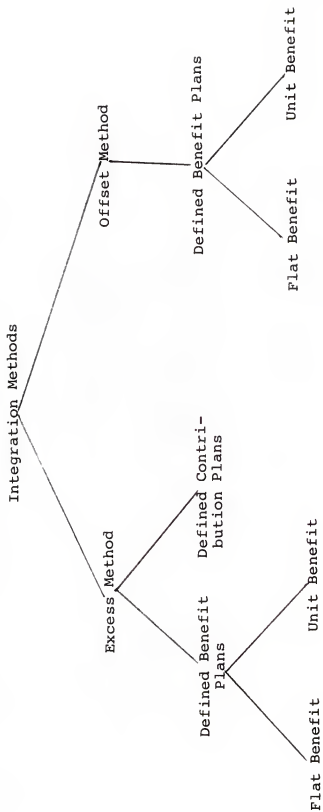
retirement annuity could be purchased with the funds credited to his account.¹⁷ There are two primary integration methods used by these two plans--the excess method and the offset method. (See Figure 2.1, p. 36.) Each of these methods is explained below.

Excess Method

The excess method allows the employer to take into account only an employee's earnings in excess of the appropriate integration level in determining his pension benefit.¹⁸ A variation of the "pure" excess method is the step-rate excess method¹⁹ where all earnings are used in applying the plan benefit formula. However, the formula applies a lower percentage to the earnings up to the integration level and a higher percentage to any excess earnings. Two types of defined benefit plans, the flat-benefit excess plan and the unit-benefit excess plan, and all defined contribution plans can be integrated using the excess method.²⁰ Each of these is discussed below.

Flat-Benefit Excess Plan

The benefits for the flat-benefit excess plan are based on an employee's average annual compensation.²¹ Average annual compensation is defined as the employee's annual compensation averaged over a period of at least five consecutive years.²² It is acceptable to use the five consecutive years that provide the highest average amount for each individual employee. If an employee has less than



INTEGRATION METHODS AND TYPES OF PENSION PLANS

FIGURE 2.1

five years of service, the average is taken over his total years of service.

The normal annual retirement benefit for any employee cannot exceed the following percentage of his average annual compensation in excess of the applicable integration level:²³

- (1) 37½ percent in the case of an employee with fifteen or more years of service with the employer at normal retirement age, and
- (2) 2½ percent for each year of service with the employer, in the case of an employee with less than fifteen years of service at normal retirement age, but not to exceed 37½ percent.

The proper integration level for a flat-benefit excess plan is the employee's covered compensation.²⁴ This amount is defined as an average of the maximum Social Security taxable wage bases in effect over an employee's normal working life.²⁵ Since this amount varies depending on the particular age of the worker, the IRS has provided a summary table which reflects the covered compensation of a retiring employee depending on the calendar year of his 65th birthday (See Appendix II, p. 177). A flat-benefit plan may set a uniform integration limit at the covered compensation level specified for the year in which the oldest possible employee reaches age 65, or it may use a separate limit for each individual employee depending on his particular covered compensation.²⁶

The integration rules applicable to a step-rate, flat-benefit excess plan are essentially the same.²⁷ However,

here the difference between the formula percentages applied to the average annual compensation above and below the integration level may not exceed the limits specified above.

The following series of examples illustrate the preceding guidelines. An integrated, flat-benefit plan would be qualified if it provided an annual benefit of $37\frac{1}{2}$ percent of average annual compensation in excess of the integration level to all employees having at least fifteen years of service. The following table shows the benefits that four employees retiring in 1983 with fifteen years of service would receive.

<u>Employee</u>	<u>Average Annual Compensation</u>	<u>Annual Pension Benefit</u>
1	\$10,000	0
2	\$15,000 [$37\frac{1}{2}\%$ X (\$15,000 - \$11,892)]	\$1,166
3	\$20,000 [$37\frac{1}{2}\%$ X (\$20,000 - \$11,892)]	3,041
4	\$30,000 [$37\frac{1}{2}\%$ X (\$30,000 - \$11,892)]	6,791

The covered compensation and thus integration level for an employee reaching sixty-five in 1983 is \$11,892. Therefore, employee one would not receive a benefit because his average compensation is below the integration level. The other three employees would receive $37\frac{1}{2}$ percent of their average annual compensation in excess of the integration level.

A step-rate, flat-benefit plan would be properly integrated if it provided an annual benefit of 50 percent of average annual compensation above the integration level and $12\frac{1}{2}$ percent of compensation below the integration level to employees with fifteen years or more of service. The same four employees from the preceding example retiring in 1983,

who meet the service requirement, would receive the following benefits.

<u>Employee</u>	<u>Average Annual Compensation</u>	<u>Annual Pension Benefit</u>
1	\$10,000 ($12\frac{1}{2}\%$ X \$10,000)	\$ 1,250
2	\$15,000 [50% X (\$15,000 - \$11,892) + $12\frac{1}{2}\%$ (\$11,892)]	\$ 3,041
3	\$20,000 [50% X (\$20,000 - \$11,892) + $12\frac{1}{2}\%$ (\$11,892)]	\$ 5,541
4	\$30,000 [50% X (\$30,000 - \$11,892) + $12\frac{1}{2}\%$ (\$11,892)]	\$10,541

Here, all employees receive some benefit; however the amount becomes proportionately greater as more of their salary is above the integration level.

Unit-Benefit Excess Plan

The second type of defined benefit plan that can be integrated using the excess method is the unit-benefit excess plan. Here benefits are based on years of service as well as compensation. An integrated, unit-benefit excess plan, under which an employee's retirement benefit is based on his actual compensation in excess of the plan's integration level, is qualified if the rate at which the normal retirement benefit is provided does not exceed 1.4 percent for each year of service.²⁸ In the case of a plan under which benefits are based on average annual compensation above the integration level, the rate may not exceed 1 percent for each year of service.²⁹

The appropriate integration level for a unit-benefit excess plan may be calculated in any one of three ways.³⁰ Under option one, the integration level is the same for all years of service and cannot exceed each employee's covered

compensation or a stated dollar amount uniformly applicable to all active participants. This latter amount cannot exceed the covered compensation of any individual who may become a participant. Under option two, the plan's integration level changes from year to year to correspond with the Social Security taxable wage base in effect for each year of service. A third option is a combination of the first two. Under option three, the integration level for all years of service before a specified date is the covered compensation for an employee who reaches age 65 in such year. For any subsequent years it equals the taxable wage base in effect in each particular year. Thus, the integration level applicable to an employee retiring in 1983 with ten years of service could be \$11,892 for each year (Option 1--the 1983 covered compensation) or it could vary from \$13,200 to \$35,700 with a different limit being applied against the wages of each year (Option 2--the Social Security taxable wage base). Finally, it could be \$17,700 for years of service 1974-1978 and vary from \$22,900 to \$35,700 for each year afterward (Option 3--combination of 1978 covered compensation and the Social Security taxable wage base). (See Appendices I and II, pp. 176-177.)

The following series of examples illustrate the unit-benefit computations. A plan may require a benefit equal to the sum of the average annual compensation in excess of the taxable wage base for each year of service, times 1 percent.

Four employees retiring in 1983 with ten years of service would be entitled to the benefits shown below.

<u>Employee</u>	<u>Average Annual Compensation</u>	<u>Annual Pension Benefit</u>
1	\$10,000	0
2	\$15,000	\$ 27
3	\$20,000	232
4	\$30,000	847

During the years of service 1974-1983, the Social Security taxable wage base was never below \$13,200. Therefore, employee one would not receive a pension benefit. The average annual compensation of employee two is only above the Social Security wage base during 1974 and 1975. His benefit, therefore, equals 1 percent of a base equalling two times \$15,000 (current compensation) minus the Social Security wage bases for these two years. Employee three's average annual compensation is above the Social Security wage base for all years until 1978. Employee four's compensation level is above the wage base for all years until 1981. Therefore, employee three's benefits equal five times \$20,000 minus the sum of the Social Security wage base for 1974-1978, times 1 percent. Likewise, employee four's benefits equal eight times \$30,000 minus the sum of the Social Security wage base for 1974-1981, times 1 percent.

Similarly, a step-rate, unit-benefit excess plan may provide a benefit equal to the sum of one-half of 1 percent times average annual compensation below each employee's covered compensation level plus one and one-half percent times average annual compensation in excess of each employee's covered compensation, times the number of years

of service. The benefits of four employees retiring in 1983 with ten years of service are calculated below.

<u>Employee</u>	<u>Average Annual Compensation</u>	<u>Annual Pension Benefit</u>
1	\$10,000 $[(.005 \times \$10,000) \times 10]$	\$500
2	\$15,000 $[(.015(\$15,000 - \$11,892) + .005(\$11,892)) \times 10]$	\$1,061
3	\$20,000 $[(.015(\$20,000 - \$11,892) + .005(\$11,892)) \times 10]$	\$1,811
4	\$30,000 $[(.015(\$30,000 - \$11,892) + .005(\$11,892)) \times 10]$	\$3,311

These pension benefits are greater than those in the preceding example because of the step rate structure of the plan and the integration level option. Covered compensation amounts reflect the average Social Security wage base over an employee's working life. These amounts are not individually adjusted and, therefore, often do not correlate with the average wage base during an employee's particular time of pension coverage.

Defined Contribution Excess Plan

Defined contribution plans, as well as the preceding two basic defined benefit plans, can be integrated under the excess method. A defined contribution plan is integrated if the contributions do not exceed 7 percent of each year's compensation in excess of the integration level.³¹ The permissible integration levels are the same as those which apply to a unit-benefit excess plan (See pages 39 and 40).³²

The Tax Equity and Fiscal Responsibility Act of 1982,³³ however, defines the maximum rate that employer contributions can bear to compensation in excess of the integration level under integrated defined contribution

plans to be the tax rate applicable to employers for old age, survivors, and disability insurance (OASDI) under Social Security.³⁴ It also has the effect of requiring the use of each year's taxable wage base as the appropriate integration limit.³⁵ These provisions apply to plan years beginning after December 31, 1983.³⁶ However, for illustration purposes, assume the provisions were applicable for 1983. A defined contribution plan could provide contributions of 5.4 percent (the employer's OASDI tax rate) of 1983 pay in excess of \$35,700. In such case, no contributions for the first \$35,700 of 1983 pay would be required.

As before, the laws applicable to step-rate defined contribution plans are the same except the difference between the percentages applied above and below the integration level is currently 7 percent and will be amended to conform with the OASDI tax rate after 1983.³⁷

The following example illustrates the employer contributions (as compared to the employee benefits calculated in the preceding examples) for four employees participating in a defined contribution plan in 1983. The plan provides a benefit of 7 percent of actual compensation above the current Social Security taxable wage base.

<u>Employee</u>	<u>Actual Compensation</u>	<u>Employer Contribution</u>
1	\$20,000	0
2	\$30,000	0
3	\$40,000 (\$40,000 - \$35,700).07	\$301
4	\$50,000 (\$50,000 - \$35,700).07	\$1,001

The actual compensation of employees one and two is below the 1983 Social Security taxable wage base of \$35,700. Hence, there would be no employer contributions made on their behalf. Employees three and four would receive contributions based only on the amount of their salary in excess of \$35,700.

A second example can illustrate the contributions for four employees participating in a step-rate plan using the current OASDI tax rate and wage base and the previously discussed integration limits enacted by the Tax Equity and Fiscal Responsibility Act of 1982.³⁸ The plan provides for contributions of 10 percent of pay in excess of \$35,700 and 4.6 percent on wages up to this amount.

<u>Employee</u>	<u>Actual Compensation</u>	<u>Employer Contribution</u>
1	\$20,000 [(\$20,000).046]	\$920
2	\$30,000 [(\$30,000).046]	\$1,380
3	\$40,000 [(\$40,000 - \$35,700).10 + (\$35,700).046]	\$2,072
4	\$50,000 [(\$50,000 - \$35,700).10 + (\$35,700).046]	\$3,072

These benefits are clearly greater due to the step-rate structure of the plan and the effect of the new law.

Offset Method

The second integration method is known as the offset method.³⁹ This method applies only to defined benefit plans. It can be used by both the flat benefit and the unit benefit variety. All employees are eligible to participate with their total compensation being used to compute benefits. The benefit rates are applied uniformly regardless of the compensation level. However, each

employee's benefit is reduced or offset by a stated percentage of his old-age insurance benefit under the Social Security Act. If an offset plan is to be considered qualified, not more than 83 1/3 percent of the primary Social Security benefit can be used to offset the pension benefit the employee would otherwise be entitled to.⁴⁰ The dollar amount of the offset is usually determined at retirement and cannot be adjusted due to changes in the Social Security law that occur after the date the employee has retired or been separated from service.⁴¹

For example, an offset formula may provide a plan participant with a monthly pension of 2 percent of average annual compensation for each year of service, reduced by 83 1/3 percent of the individual's primary Social Security benefit. Under this formula, four employees retiring in 1983 with twenty years of service could expect the following benefits:

<u>Employee</u>	<u>Average Annual Compensation</u>	<u>Gross Annual Pension Benefit</u>	<u>Social Security Benefit Offset</u>	<u>Net Annual Pension Benefit</u>
		(1)	(2) = .833 x Ann. S/S*	(3) = (1) - (2)
1	\$10,000	\$4,000	\$4,900	\$ 0
2	\$15,000	\$6,000	\$6,200	\$ 0
3	\$20,000	\$8,000	\$6,400	\$1,600
4	\$30,000	\$12,000	\$6,400	\$5,600

* Ann. S/S = Annual Social Security benefits

Despite their long service history, employees one and two would not receive any private pension plan benefits because their gross annual pension benefit is less than the amount of the offset applied against it. The difference in the net

pension benefits employees three and four would receive points out the effect of the Social Security benefit ceiling. Once an employee's gross private pension plan benefit exceeds 83 1/3 percent of this ceiling, the net pension benefit begins to increase rapidly with increased average annual compensation levels.

The preceding excess and offset integration guidelines for defined benefit plans apply only if the plan pays no death, disability, or early retirement benefits; employee contributions are not required; and the form of the retirement benefit is a straight-life annuity. Detailed adjustments are required to the integration limits for benefit plans that do not meet each of these requirements.⁴² A summary of these adjustments can be found in Appendix III, p. 178.

Proposed Modifications

In January 1978, President Carter presented modified integration limits as part of his tax program.⁴³ He proposed that the current rules relating to the excess method of integration be replaced with a rule under which a plan would not be viewed as discriminatory in favor of officers, shareholders, or highly compensated employees merely because it provided benefits or contributions in the form of

X percent of total compensation not in excess of a specified integration level, plus no more than 1.8 times X percent of total compensation in excess of that level.

The rule would apply to defined benefit plans providing unit or flat benefits and defined contribution plans. The X factor would be specified by the employer.

The integration level would be computed in much the same manner as is provided under the current excess defined benefit and defined contribution plan rules. However, no adjustment would be required even though some plans might use different types of compensation (average annual compensation or actual compensation) so long as the same type is used to compute benefits both above and below the integration level.

Carter also proposed that an offset plan be permitted to reduce the gross benefit provided under the plan (the plan benefit before reduction for Social Security, usually expressed as X percent times average annual compensation) with that portion of the Social Security primary insurance amount (PIA) equal to the same percent as the gross benefit percentage. That is, a plan would be permitted to offset up to 50 percent of Social Security if it applied the offset against a gross benefit of 50 percent of compensation, or a plan could offset 100 percent of Social Security if it applied the offset against a gross benefit of 100 percent.

As previously mentioned these proposals failed to get through Congress primarily due to opposition by pension consulting groups. Thus, again in 1982 proposed modifications to the integration limits appeared in the Pension Equity Tax Bill (H.R. 6410).⁴⁴ Here, Congress

proposed that the integration rules for defined benefit plans be revised to permit an employee's annual pension benefit to be reduced by no more than an amount equal to the annual benefit which could be purchased with the aggregate OASDI taxes actually paid by the employer on behalf of the employee. Under the bill, the Secretary of the Treasury was to prescribe regulations for converting the aggregate Social Security taxes paid by an employer to an equivalent annual pension benefit. These rules were to provide for compounding the annual employer OASDI taxes at an appropriate interest rate. Again due to opposition by pension consultants this part of the bill was not passed. However, H.R. 6410 also introduced the modified integration limits for defined contribution plans that were subsequently passed as part of The Tax Equity and Fiscal Responsibility Act of 1982. (See pages 42 and 43.)

Notes

¹I.R.C. Sections 404(a) (1) and 402(a).

²However, regardless of the employee's age, he must be at least 50 percent vested after ten years of service and acquire an additional 10 percent for each additional year of service thereafter.

³Employee Retirement Income Security Act of 1974, Public Law No. 93-406, September 2, 1974.

⁴I.R.C. Sections 401(a) (4) and 410(b) (1) (B).

⁵The second alternative is provided for contributory plans because employees may have to elect coverage.

⁶Treas. Reg. §1.401-3(e) (1).

⁷Federal Insurance and Contributions Act, Public Law No. 271, August 14, 1935.

⁸I.R.C. Section 3111.

⁹I.R.C. Section 3101.

¹⁰I.R.C. Section 3111(a)(5). In addition, the hospital insurance tax rate is 1.3 percent for the employer and employee, respectively.

¹¹I.R.C. Section 3121(a).

¹²1971-2 C.B. 187.

¹³Howard E. Winklevoss, Pension Mathematics: With Numerical Illustrations (Homewood, Illinois: Richard D. Irwin, Inc., 1977) pp. 1-2.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Ibid.

¹⁷Ibid.

¹⁸Rev. Rul. 71-446, 1971-2 C.B. 187, Sec. 2.06.

¹⁹Ibid., Sec. 16.

²⁰Ibid., Secs. 5, 6, 14 and 16.

²¹Ibid., Sec. 5.02

²²Ibid., Sec. 3.01.

²³Ibid., Sec. 5.02.

²⁴Ibid., Sec. 5.01.

²⁵Ibid., Sec. 3.02.

²⁶Ibid., Secs. 3.03 and 3.04.

²⁷Ibid., Sec. 16.

²⁸Ibid., Sec. 6.02.

²⁹Ibid., Sec. 6.03.

³⁰Ibid., Sec. 6.01.

³¹Ibid., Secs. 14.01 and 15.01.

³²Ibid., Sec. 15.01.

³³Tax Equity and Fiscal Responsibility Act of 1982, Public Law No. 97-248, August 19, 1982.

³⁴Section 249(a) of Public Law No. 97-248 redesignates Sections 401(l) and 401(o) and inserts new Section 401(l).

³⁵I.R.C. Section 401(l).

³⁶Ibid.

³⁷Ibid.

³⁸Tax Equity and Fiscal Responsibility Act of 1982, Public Law No. 97-248, August 19, 1982.

³⁹Rev. Rul. 71-446, 1971-2 C.B. 187, Sec. 7.01.

⁴⁰Ibid.

⁴¹Ibid., Sec. 7.04.

⁴²Ibid., Secs. 8, 9, 10, 11, 12, and 13.

⁴³U.S. Department of the Treasury, The President's 1978 Tax Program--Detailed Descriptions and Supporting Analyses of the Proposals (Washington, D.C.: U.S. Government Printing Office, 1978) pp. 147-163.

⁴⁴U.S. Congress, House, Pension Equity Tax Bill of 1982, H.R. 6410, 97th Cong., 2d sess., May 19, 1982, pp. 9-11.

CHAPTER III

NATURE OF THE INTEGRATED PRIVATE PENSION TAX SUBSIDY

Definition of the Pension Subsidy

A tax subsidy or tax expenditure item arises when provisions of the Internal Revenue Code contain special exemptions, exclusions, deductions, and other tax benefits that are not integral to the basic structure of our tax system. Currently, our tax system is structured as an income-based tax system where income is taxed as it accrues. Ideally, such a system should rely on a concept of comprehensive income.¹ This concept defines income as an entity or individual's consumption plus change in net worth. A provision exempting any portion of this income from taxation as it accrues can be considered a tax subsidy.

Under a comprehensive concept of income, the increase in the present value of expected pension benefits as a result of pension contributions made by an employer on an employee's behalf would be taxable to that employee in the taxable year the contributions were made. Likewise, the increase in the present value of expected pension benefits as a result of interest that is earned on these contributions would be taxable as the interest accrues. It can be argued that this would not be the case for an employee whose rights to a pension benefit are not vested.

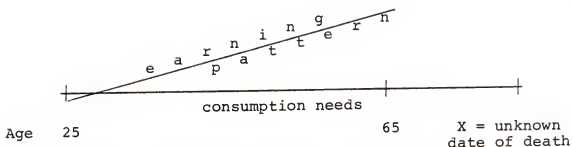
However, for a fully-vested employee, these contributions and interest represent an increase in net worth.

However, the current tax system allows compensation in the form of employer contributions to qualified pension plans to be deducted by the employer when the contributions are made and to not be taxed to the employee until benefits are distributed from the plan.² Moreover, income earned on accumulated contributions is not taxable until distributed to beneficiaries.³ By allowing the worker to defer the taxes until retirement, qualified plans offer two main advantages over nonqualified plans. First, the full dollar of contribution, without any reduction for income taxes, is available for investment during the employee's working years. This is in sharp contrast to the situation where a dollar is paid in current compensation and the employee has only the after-tax dollar to invest. Second, no tax is currently paid on the investment income from qualified pension funds, whereas income earned on the employee's nonqualified investment is subject to tax as it accrues.⁴ Thus, each of these two forms of tax deferral results in a subsidy that is equivalent to an interest-free, long-term loan from the government. A recent estimate of the annual cost, or loss in tax revenues, as a result of the pension tax subsidy was fifteen billion dollars for fiscal year 1981.⁵

Economic Rationale for the Pension Tax Subsidy

Tax subsidies or expenditures have been incorporated into the current tax structure for one of two reasons.⁶ The first reason is to relieve some personal hardship. An example of this type of tax subsidy appears in Internal Revenue Code Section 151(d), which provides an additional personal exemption deduction for the blind. The second reason for a tax subsidy is to provide an incentive for certain behavior or activities considered socially desirable. This is the category the current pension tax subsidy would fall into. It endeavors to encourage employers to set up retirement plans for their employees. The economic rationale for the private pension tax subsidy is explored below.

In general, individuals have consumption needs from the age of at least twenty-five until death that they must provide for out of their lifetime earnings. Their earnings stream may generate less income than the amount needed to meet these needs in the early years and more income than is necessary for current consumption in the later years. Also, their earning years are usually fewer than their consumption years. This is depicted graphically below.



Therefore, to maximize lifetime utility, individuals must allocate earnings so as to smooth lifetime consumption. This usually involves deferring a portion of earnings from peak earning years to meet consumption needs during retirement.⁷

However, people face a high degree of uncertainty in estimating future earning patterns and consumption needs. They are unsure of how long they will be able to work, how long they will live after retirement, and how much it will cost them to provide for themselves in their old age. If people are risk averse there is a natural demand for some kind of insurance against these uncertainties. The appropriate form of this insurance is an annuity--a public or private pension. These enable people to at least pool the risks of their uncertain life spans.

The Social Security system was developed in the early 1930s as just such a public retirement system. However, Congress still felt it was necessary to encourage the establishment of private pension plans as well as to maintain the Social Security system. Social Security benefits were intended to be kept at a level necessary to

provide a minimum floor of protection. Private pensions are best suited to provide the additional amount necessary for adequate retirement income. Private pension plans can be tailored to a subgroup's preferences. Social Security, however, is one broad plan for a very heterogeneous population.

In subsidizing the private pension system, however, Congress limited favorable tax treatment to those plans that did not discriminate in favor of stockholders, officers, or other highly-compensated individuals.⁸ Note, the purpose of a tax subsidy is to induce some desirable action that would not otherwise occur without the subsidy. Congress, therefore, wanted to encourage pension plan coverage for those individuals who may not otherwise have had adequate retirement income by offering a tax break. However, these people tend to be in lower tax brackets and are less affected by favorable tax treatment. Therefore, tax relief was offered to all plan participants as long as the lower-paid employees were included proportionately in the plan. Thus, to promote broad private pension coverage, Congress chose to link saving incentives for the higher-paid employees and employers to saving incentives for the rank-and-file employees.⁹

The Consistency of Integration with the Economic Rationale for the Pension Tax Subsidy

The detailed mechanics of the integration rules were discussed in Chapter II. In essence, integration allows

private pension plan benefits to be subsidized if, when combined with the retirement benefits paid by Social Security, they are proportional to wage income. To be qualified, the pension plan benefits alone need not be proportional to wage income. This approach is based on the premise that public and private retirement programs should function as a unified system. Thus, if the Social Security program is weighted in favor of low-income workers, the subsidized private pension system should favor high-income workers.

The validity of this approach, however, can be questioned. Using integration to counterbalance the bias of the Social Security system in favor of lower-paid workers by limiting their private pension coverage is inconsistent with Social Security's original goal of providing only minimum levels of earnings replacement. It implies that Social Security is adequate for low and middle wage earners. If this were the case, there would be no need for a tax subsidized private pension system at all.

With the past and future increases in the Social Security taxable wage base and benefits, the integrated private pension tax subsidy may be more and more focused on only the higher paid. Thus, integration has created a large degree of uncertainty concerning the effectiveness of the current tax subsidy in promoting a broad-based pension system. It is not clear which, or to what extent, particular employee groups are benefiting from it.

The possible inequities of the integration rules have long been recognized. In 1974, during the ERISA deliberation, Congress voted to halt any further integration of pension plans until a two-year study could be completed. However, due to heated opposition by pension consultants, the freeze was deleted by a concurrent resolution of Congress.¹⁰ In January 1978, President Carter presented a proposal to Congress calling for a reduction in the integration limits.¹¹ However, no action was taken. Finally in 1982, H.R. 6410 was introduced in the House, without success, as another attempt to limit integration.¹² Thus, there is still a need to determine empirically the effect integration has had on the focus of the private pension tax subsidy as input for any further consideration of reform legislation.

Related Research

To date, five survey studies have been done on the prevalence of private pension plan integration--the 1974 Congressional Research Service study, the 1975 Bankers Trust study, the A. S. Hansen study, the National Associates study, and an analysis by Gabriel Rudney of the Treasury Department.¹³ These studies present varying statistics on the numbers and types of plans which are integrated, as well as the number of participants affected. All of the studies point out, however, that integration affects a large number of plans and participants. Approximately, 60 percent of the

more than 400,000 active corporate retirement plans in the United States are integrated.¹⁴ These integrated plans cover about 30 percent or more of all U.S. pension plan participants.¹⁵ None of the previously mentioned studies reveals any detailed statistics concerning the actual benefit formulas or the characteristics such as salary, age, and tenure of the participants covered.

Only two studies have attempted to show the effect of the integration laws on pension plan benefits. The first was a dissertation done by Michael M. Delaney¹⁶ comparing the benefits required using the limitations provided under the excess integration method versus the offset integration method. This work assumed a January 1, 1975, retirement date and a final year's earnings level of \$10,000, and determined that the excess plan structure provided greater benefits than the offset plan. The sensitivity of this differential to years of service (1-19 year range) was especially large. This result is due to a failure of the IRS guidelines to require that the offset amount be prorated to reflect an adjustment for shorter years of service.

Delaney also extended his analysis to compare the benefits provided under the two methods for a retirement date of 2075. Projections of future Social Security benefits and wage ceilings found in the Social Security Act in effect in 1976 were used. The results were the same as those in the original analysis, in that the excess plan structure provided greater benefits than the offset plan.

The advantage of the excess plan structure, however, was greater.

The second study was a simulation done in 1980 by Ray Schmitt¹⁷ that determined the earnings replacement rate (percentage of preretirement earnings replaced after retirement with pension and Social Security benefits) for twenty-five hypothetical workers. These workers were retiring on January 1, 1979, at age sixty-five with final year's earnings ranging from \$4,000 to \$100,000 and with ten, twenty, or thirty years of service. The replacement rates were calculated for this group of workers using four pension benefit formulas. These were

1. 1.5 percent of compensation times number of years of service less 50 percent Social Security (offset).
2. 1.5 percent of compensation times number of years of service less 83 1/3 percent Social Security (offset).
3. 1 percent of compensation in excess of integration level (\$8,724) times number of years of service (unit benefit excess).
4. 37 1/2 percent of compensation in excess of integration level (\$8,724) (flat benefit excess).

This research found significantly different replacement rates depending on the pension formula, years of service, and earnings level.

The studies done by Delaney and Schmitt were limited to hypothetical workers and the potential effects of integration on retirement benefits. Their purpose was not an attempt to simulate what happens in actual practice but

only to demonstrate what may happen under present integration guidelines given the wage histories and assumptions they used. Schmitt states that his approach was taken because ". . . information on salary levels and job tenure for representative plans is generally not available."¹⁸

In addition, the analysis of the potential impact of integration on future retirement benefits was done by Delaney only for the year 2075. His work was completed prior to enactment of the Social Security Amendments of 1977,¹⁹ which significantly changed the estimates of future Social Security benefits, tax rates, and wage bases. Therefore, his results may be biased by the inaccuracy of predictions 100 years into the future and the use of an outdated projection base.

The purpose of this study is to analyze the effect of integrated pension formulas found in existing plans on the current and future benefits of the employees currently covered by these plans. Thus, the analysis will be based on data from actual plans and their participants and will be extended to include calculations of benefits for retirement dates ranging from 1984 to 2019.

These extensions are important for two reasons. First, empirical data are essential since there are many variations of integrated pension plans employed in practice. It can be seen from the previous discussion of integration methods, and also the results of the research done by Delaney and

Schmitt, that the employer has a wide variety of plan formulas available to him that could provide very different benefits and still meet one of the integration limits. This need for empirical data is also echoed by Gabriel Rudney who states that ". . . No one has yet produced figures on plan participants affected by integration. Yet the demand by public policy officials for some indicator is persistent."²⁰

Second, extending the analysis to calculations of benefits for current workers with retirement dates ranging from 1984 to 2019 makes it possible to examine extensively the effect of the currently projected salary growth and Social Security tax rate and wage base increases on integrated pension benefits. It is evident from the structure of the integration methods that these increases will have a significant effect on the level of benefits provided.

The effect of existing integrated pension formulas on pension benefit levels will primarily be determined by comparing the expected integrated benefits of employees currently covered under these plans to the benefits these employees would expect under nonintegrated, equivalent-nonintegrated, and equivalent-modified-integrated pension plan formulas. This study will also determine whether current expected integrated benefits are adequate to maintain preretirement living standards for various earnings levels. There have been no previous studies making any of these comparisons. These comparisons should aid policy

makers in determining what modifications to the integration limits, if any, would be most desirable.

Notes

¹U.S. Department of the Treasury, Blueprints for Basic Tax Reform (Washington, D.C.: U.S. Government Printing Office, 1977) pp. 1-4.

²I.R.C. Sections 404(a)(1) and 402(a).

³I.R.C. Section 501(a).

⁴Ibid.

⁵Alicia Munnell, The Economics of Private Pensions (Washington, D.C.: Brookings Institution, 1982) pp. 46-49.

⁶Stanley S. Surrey, Pathways to Tax Reform, The Concept of Tax Expenditures (Cambridge: Harvard University Press, 1973) pp. 1-30.

⁷For a more complete discussion of individual saving behavior see Edwin Mansfield, Economics (New York: W. W. Norton and Co., Inc., 1977) pp. 185-202.

⁸I.R.C. Section 401(a)(4).

⁹Testimony by Daniel Halperin, Tax Legislative Counsel, Office of the Assistant Secretary of the Treasury for Tax Policy in U.S. Congress, House of Representatives, Hearings Before the Subcommittee on Retirement Income and Employment of the Select Committee on Aging (Washington, D.C.: U.S. Government Printing Office, 1978) p. 43.

¹⁰U.S. Congress, Ways and Means Committee, Private Pension Tax Reform, H.R. 93-807, 93rd Cong., 2d sess., 1974, p. 29.

¹¹U.S. Department of the Treasury, The President's 1978 Tax Program--Detailed Descriptions and Supporting Analyses of the Proposals (Washington, D.C.: U.S. Government Printing Office, 1978) pp. 147-163.

¹²U.S. Congress, House, Pension Equity Tax Bill of 1982, H.R. 6410, 97th Cong., 2d sess., May 19, 1982, pp. 9-11.

¹³These studies are cited and summarized in U.S. Congress, Joint Economic Committee, Social Security and Pensions: Programs of Equity and Security, "Integrated

Pension Plans: An Analysis of Earnings Replacement," by Ray Schmitt, Joint Committee Print, Study Paper 8 (Washington, D.C.: U.S. Government Printing Office, 1980) p. 2 and Appendix C.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Michael M. Delaney, "Integration of Private Pension Plans with Social Security," (Ph.D. dissertation, University of Pennsylvania, 1976).

¹⁷U.S. Congress, Joint Economic Committee, Social Security and Pensions: Programs of Equity and Security, "Integrated Pension Plans: An Analysis of Earnings Replacement," by Ray Schmitt, Joint Committee Print, Study Paper 8 (Washington, D.C.: U.S. Government Printing Office, 1980).

¹⁸Ibid., p. 100.

¹⁹Social Security Amendments of 1977, Public Law No. 95-216, December 20, 1977.

²⁰Gabriel Rudney, "Integration--Scope of the Problem," Pensions and Investments (March 3, 1980) p. 32.

CHAPTER IV

RESEARCH METHODOLOGY

This study employs an empirically based microsimulation model to compare the expected pension benefits from currently subsidized integrated pension plans to three benchmarks--pension benefits proportional to wage income, expected pension benefits from plans which meet the proposed integration limits, and pension benefits which are adequate to maintain preretirement living standards. The purpose of this comparison is to determine the effectiveness of the present tax subsidy in providing adequate retirement income to all classes of workers. The appropriate structure for the pension tax subsidy is unknown. Therefore, the comparison is made to three possible benchmarks to provide Congress with the maximum input for making this social policy decision.

General Model

Comparing actual integrated pension benefits to the first benchmark--benefits which are proportional to wage income--requires a calculation of actual integrated benefits, actual nonintegrated benefits, and equivalent-nonintegrated benefits. Similarly, comparing actual integrated pension benefits to the second benchmark--the

1978 integration proposal--requires a calculation of actual integrated benefits and equivalent-modified-integrated benefits. Finally, comparing actual integrated benefits to those necessary to maintain preretirement living standards only requires a calculation of actual integrated benefits. The benefits necessary to maintain preretirement living standards are taken from another study.¹

Thus, the microsimulation model consists of actual integrated and nonintegrated pension benefit formulas and the appropriate conversion for the integrated formulas to equivalent-nonintegrated and equivalent-modified-integrated formulas. A constraint is also built into the model which limits the annual retirement benefit for each simulated employee to the maximum allowable amount in Code Section 415. Code Section 415(b)(1) limits the annual benefit to which a participant is entitled at any time under a defined benefit plan to the lesser of \$90,000 or 100 percent of the participant's average compensation for his high three preretirement years. The \$90,000 is allowed to be adjusted to reflect increases in the cost of living for plan years beginning after December 31, 1985.² The model is illustrated in Table 4.1, pp. 66-70, using the general structure of the integrated and nonintegrated plans analyzed. Complete lists of the specific benefit formulas utilized in the model are found in Appendices IV and V, pp. 180-193.

TABLE 4.1
GENERAL RETIREMENT BENEFIT MICROSIMULATION MODEL

Integrated Pension Formulas

1. Flat-benefit excess

$$Y\% \times (\text{smaller of NR or CSM}) \times (\text{COMP. BASE} - \text{IL})$$
2. Step-rate, flat-benefit excess

$$[Y\% \times (\text{smaller of NR or CSM}) \times (\text{COMP. BASE} - \text{IL})] + (Z\% \times \text{Comp. BASE up to IL})$$
3. Unit-benefit excess

$$Y\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}$$
4. Step-rate, unit-benefit excess

$$[Y\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}] + Z\% \times (\text{COMP. BASE up to IL}) \times \text{NR}$$
5. Flat-benefit with a flat-offset

$$(Y\% \times \text{COMP. BASE}) - (Z\% \times \text{PIA})$$
6. Flat-benefit with a unit-offset

$$(Y\% \times \text{COMP. BASE}) - (Z\% \times \text{PIA} \times \text{NR})$$
7. Unit-benefit with a flat-offset

$$(Y\% \times \text{COMP. BASE} \times \text{NR}) - (Z\% \times \text{PIA})$$
8. Unit-benefit with a unit-of-offset

$$(Y\% \times \text{COMP. BASE} \times \text{NR}) - (Z\% \times \text{PIA} \times \text{NR})$$
9. Step-rate, unit-benefit excess with a unit-offset

$$[Y\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}] + [Z\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}] - (X\% \times \text{PIA} \times \text{NR})$$

Table 4.1 continued

10. Variable-unit-benefit with a flat-offset

$$(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - (Z\% \times \text{PIA})$$

11. Variable-unit-benefit with a flat-dollar-offset

$$(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - \text{AMT}$$

12. Variable-unit-benefit with a unit-offset

$$(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - (Z\% \times \text{PIA} \times \text{NR})$$

13. Variable-unit-benefit with a variable-unit-offset

$$(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - [(Z_1\% \times \text{PIA} \times \text{NR}_1) + (Z_2\% \times \text{PIA} \times \text{NR}_2)]$$

Equivalent-Nonintegrated Pension Formulas

1,2. $Y_1\% \times (\text{smaller of NR or CSM}) \times \text{COMP. BASE}$

3,4,7-13. $Y_2\% \times \text{COMP. BASE} \times \text{NR}$

5,6. $Y_3\% \times \text{COMP. BASE}$

Equivalent-Modified Integrated Pension Formulas

1,2. $[Y\% \times (\text{smaller of NR or CSM}) \times (\text{COMP. BASE} - \text{IL})] + (Y/1.8\% \times \text{COMP. BASE up to IL})$

3,4. $[Y\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}] + [Y/1.8\% \times (\text{COMP. BASE up to IL}) \times \text{NR}]$

5,6. $(Y\% \times \text{COMP. BASE}) - (Y\% \times \text{PIA})$

7,8. $(Y\% \times \text{COMP. BASE} \times \text{NR}) - (Y\% \times \text{PIA} \times \text{NR})$

9. $[Y\% \times (\text{COMP. BASE} - \text{IL}) \times \text{NR}] + [Y/1.8\% \times (\text{COMP. BASE up to IL}) \times \text{NR}] - (Y/1.8\% \times \text{PIA} \times \text{NR})$

Table 4.1 continued

- 10,12. $(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - [(\text{smaller of } W_1 \text{ or } W_2) \times \text{PIA} \times \text{NR}]$
11. $(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - [\text{smaller of (AMT) or (the smaller of } W_1 \text{ or } W_2 \times \text{PIA} \times \text{NR})]$
13. $(W_1\% \times \text{COMP. BASE} \times \text{NR}_1) + (W_2\% \times \text{COMP. BASE} \times \text{NR}_2) - [(W_1\% \times \text{PIA} \times \text{NR}_1) + (W_2\% \times \text{PIA} \times \text{NR}_2)]$

Nonintegrated Pension Formulas

1. Flat-dollar
AMT
2. Unit-dollar
AMT X NR
3. Variable-unit-dollar
 $\text{AMT}_1 \times \text{NR}_1 + \text{AMT}_2 \times \text{NR}_2$
4. Variable-unit-dollar
 $\text{AMT}_1 \times \text{NR}$ if $\text{COMP. BASE} \leq \text{AMT}_A$
+ $\text{AMT}_2 \times \text{NR}$ for each additional AMT_B of COMP. BASE
or $\text{AMT}_3 \times \text{NR}$ if $\text{COMP. BASE} > \text{AMT}_C$
5. Flat-benefit
 $Y\% \times \text{COMP. BASE}$
6. Unit-benefit
 $Y\% \times \text{COMP. BASE} \times \text{NR}$
7. Variable-unit-benefit
 $W_1\% \times \text{COMP. BASE} \times \text{NR}_1 + W_2\% \times \text{COMP. BASE} \times \text{NR}_2$

Table 4.1 continued

Constraint

$ARB \leq \text{min. of } (\$90,000 \times COL) \text{ or } AAC3.$

Definitions of Variables

- AAC3 - Average annual compensation over last 3 years of service
- AMT - dollar amount specified by plan
- $AMT_1, AMT_2, AMT_3, AMT_A, AMT_B, AMT_C$ - variable dollar amounts specified by plan
- ARB - annual retirement benefit
- COL - post-1984 cost-of-living increases measured by the formula used to adjust Social Security benefit payments. COL will equal one for years before 1986.
- COMP. BASE - compensation base, may equal:
- 1) earnings for each year worked
 - 2) career average at normal retirement
 - 3) average wages during last ____ year(s)
 - 4) average wages during years 19 ____ through retirement
- CSM - credited service maximum specified by plan
- IEB - integrated expected benefit
- IL - integration level, may equal:
- 1) flat dollar amount, corresponding to covered compensation, for each year
 - 2) Social Security taxable wage base for each year
 - 3) career average Social Security taxable wage base
 - 4) average Social Security taxable wage base during last ____ year(s)

Table 4.1 continued

5) average Social Security taxable wage base during years 19 ____ through retirement

6) dollar amount specified by plan

NR - years of service at normal retirement

NR₁, NR₂ - years of service included in ranges specified by plan

PIA - Social Security primary insurance amount

W₁, W₂, Z₁, Z₂ - variable percentages specified in pension plan

X, Y, Z - percentages specified in pension plan

$$Y_1 - \text{maximum} \left[\frac{\text{IEB}}{\text{comp. base}} / \text{min of (NR or CSM)} \right] \text{ratio}$$

$$Y_2 - \text{maximum} \left[\frac{\text{IEB}}{\text{comp. base}} / \text{NR} \right] \text{ratio}$$

$$Y_3 - \text{maximum} \left[\frac{\text{IEB}}{\text{comp. base}} \right] \text{ratio}$$

In converting the actual integrated pension formulas to equivalent-nonintegrated pension formulas, the model assumes that the highest ratio of integrated pension benefits to compensation is maintained for each plan. The explanation for this and how it is accomplished can be illustrated with an example. Suppose an integrated plan formula specified benefits of

$$37\frac{1}{2}\% \times (\text{Compensation Base} - \text{Integration Level}).$$

In determining the degree to which integration has caused the current tax subsidy to deviate from proportionality, it would be misleading to compare the actual integrated formula to the following benefit formula:

$$37\frac{1}{2}\% \times \text{Compensation Base}.$$

This procedure would overstate the effect of integration. Instead, this model will determine the highest benefit to compensation ratio for any participant in the plan and apply that ratio to the compensation of all other participants in the plan in order to determine equivalent-nonintegrated benefits.

If three simulated employees had annual incomes of \$15,000, \$20,000, and \$30,000, respectively, and the integration level for this particular integrated formula was \$11,892, then the highest benefit to compensation ratio would be 22.6 percent. This ratio would be applied to the compensation of all other participants in the plan as illustrated below.

<u>Employee</u>	<u>Compensation</u>	<u>Actual Integrated Pension Benefit</u>	<u>Benefit to Compensation Ratio</u>	<u>Equivalent Nonintegrated Pension Benefit</u>
1	\$15,000	\$1,166*	7.8%	\$3,390**
2	20,000	3,041	15.2%	4,520
3	30,000	6,791	22.6%	6,791

* 37.5% X (15,000 - 11,892)

** 22.6% X 15,000

Thus, each simulated employee in this particular plan would be assigned an equivalent-nonintegrated pension benefit equal to 22.6 percent of his compensation base.

The actual integrated pension formulas that would not fall within the integration limits proposed in 1978 are also converted by the model to equivalent-modified-integrated pension formulas. For flat-benefit and unit-benefit excess plans the benefit percentage applied to compensation above the integration level is maintained. However, the benefit percentage applied to compensation below the integration level is increased so that it equals the percentage applied above the integration level divided by 1.8. This conforms with the 1978 proposal specifying that the benefit percentage applied above the integration level be no more than 1.8 times the benefit percentage applied below the integration level. Likewise, plans which are integrated using the offset method are converted by maintaining the benefit percentage applied to the compensation base but reducing the percentage applied to the primary insurance amount until it equals that applied to the compensation base. The one general type of integrated formula that is a combination of

the excess and offset method of integration (formula 9) is converted by employing both of the methods explained above.

Selection of Plans

Sample of Integrated and Nonintegrated Plans

The sample of actual integrated and nonintegrated pension plans used in this study was derived from the pension tape that was compiled from the 1981 Level of Benefits Study³ done by the Bureau of Labor Statistics. The 1981 study surveys the incidence and provisions of eleven employee benefits, including pension plans, in medium and large size firms. It is representative of 21.5 million full-time employees in private sector establishments in the United States, excluding Alaska and Hawaii, which employ at least 50, 100, or 250 workers, depending on the industry. Industrial coverage includes mining; construction; manufacturing; transportation, communications, electric, gas, and sanitary services; wholesale trade; retail trade; finance, insurance, and real estate; and selected services.

The sampling frame was developed from the most recently available State Unemployment Insurance reports filed by 43,325 establishments in 48 states and the District of Columbia. From this framework, a sample of 1,505 establishments was selected by first stratifying the frame by industry group and establishment size group based on the total employment in the establishment. The industry groups were

defined as the eight categories listed above. The establishment size groups were defined as follows:

<u>Establishment Size Group</u>	<u>Establishment Employment</u>
1	50 - 99
2	100 - 249
3	250 - 499
4	500 - 999
5	1,000 - 2,499
6	2,500 - 4,999
7	5,000 - 9,999
8	10,000 and over

The sample size was then allocated to each stratum (defined by industry and size) approximately proportional to the total employment of all sampling frame establishments in the stratum. Thus, a stratum which contained 1 percent of the total employment within the scope of the survey received approximately 1 percent of the total sample. The result of this allocation procedure is that each stratum will have a sampling fraction (the ratio of the number of units in the sample to the number in the sampling frame) which is proportionate to the average measure of size of the units in the stratum. Within each stratum, a random sample was selected.

Data for the survey were collected by personal visits of Bureau of Labor Statistics field representatives to the sampled establishments. To reduce the reporting burden, respondents were asked to provide documents describing their private pension plans. These were analyzed by the Bureau of Labor Statistics in Washington to obtain the required data on plan provisions.

Out of the 1,505 establishments in the sample, 1,295 establishments employing 4,433,951 people were able to be contacted and agreed to respond. A composite picture of the establishment response to the survey is presented below.

Number of establishments:

In sample	1,505
Out of business and out of scope	53
Refusing to respond	157
Responding	1,295

The information on the pension tape compiled in the Level of Benefits Study⁴ was organized as a plan data file, and a control file. The data file contained detailed information on the benefit structure of 963 private pension plans. There were 111 records per plan and 256 characters per record. Each record addressed a different aspect of the plan. Plans were not explicitly labeled as integrated or nonintegrated. Using the coding manual, each possible form of benefit or contribution formula that was integrated was identified. The integrated and nonintegrated plans were then divided by printing separately the plans which contained coding for the integrated formulas and those which did not. There were a total of 522 integrated plans and 441 nonintegrated plans. All of the integrated formulas turned out to be defined benefit plans rather than defined contribution plans. Twenty of the nonintegrated formulas were defined contribution plans, however.

The identifying characteristics of the integrated and nonintegrated plans were then determined. The characteristics focused on were unionization of participants, geographic region, and standard industrial classification. The tenth record on the data file asked what type of employees were covered by the plan. Plans were then coded as either covering employees who were members of collective bargaining units or employees who were not. This characteristic then could be determined by printing this record directly from the data file tape.

The control file contained the information necessary to determine geographic region and standard industrial classification. This tape, however, was organized in a manner different from the data tape. There were 59,500 records with 160 characters per record on the tape. There was a separate record for each plan for each establishment-employee group that was covered by the plan.

The employees covered by each plan were divided into three groups: professional and administrative, technical, and clerical. There may have been other types of employees covered under the plan. However, it was only useful for the Bureau of Labor Statistics to ascertain how many employees in each of these three groups were covered by particular plans. Also, each plan identified with a single employer identification number, and thus appearing once on the data file, may be used at several different establishment locations. Therefore, there were at least three records per

single plan and usually quite a few more than this on the control file.

In order to match the control file to the data file, the data file was first sorted according to a single number designated as EIN/PN/PSN. It was composed of the employer identification number, the plan number, and the plan sequence number. There was one such single identifying number for each of the 963 plans in the data file. All identical EIN/PN/PSN numbers were grouped together on the control file as they had been scrambled before being coded onto the tape. Then this file too was sorted numerically according to the EIN/PN/PSN number.

There were still several control records for each data record. When all of the control records matched with a particular data plan record contained the same geographic region and standard industrial classification coding variables, those particular variables were identified with that plan. However, in the case where a particular plan was used by more than one establishment with the same employer identification number, there may have been more than one region and industry variable associated with the same plan. To achieve a one-to-one match for each plan, the area and industry with the most plan participants was selected. Thus, each of the 963 plans was identified as union or nonunion; by region of the country--northeast, south, north central, and west; and by industry classification--mining, construction, manufacturing, transportation and

communication, wholesale trade, retail trade, finance, insurance and real estate, and services. A summary of each of the three identifying characteristics for the two groups of plans, integrated and nonintegrated, is found in Chapter V.

Subsample of Integrated Plans

The sample of 522 integrated plans was reduced to a representative subsample of seventy-five integrated plans to make the simulation more manageable. Of the 522 original plans, two were miscoded. Thus, only 520 were usable. Another thirteen plans were thrown out of the subsequent analysis because their benefit formulas were offset by either 99 or 100 percent of the primary Social Security benefit. Thus, they would fail to qualify for favorable tax treatment. Since the purpose of this study is to determine the effectiveness of the present integrated pension tax subsidy in providing adequate retirement income to all classes of workers, employees receiving benefits from unsubsidized pension plans were deleted from the analysis.

The remaining 507 integrated plans were divided into their eight respective industries. See Table 4.2, p. 79, for a summary of the number of plans in each industry group. All five of the plans from the construction industry were included in the subsample. Ten plans from each of the remaining seven industries compose the other seventy plans in the subsample.

TABLE 4.2
INTEGRATED PENSION PLANS
CLASSIFIED BY INDUSTRY

Industry	Number of Plans
Mining	11
Construction	5
Manufacturing	271
Transportation and Communitcation	50
Wholesale Trade	24
Retail Trade	41
Finance, Insurance, and Real Estate	89
Services	16
Total	507

These ten plans were selected by classifying the integrated formulas according to the significant variables affecting the level of benefits. The benefit formulas within each industry were first divided into six broad categories. These categories were offset plan, excess plan with an integration level of a prespecified dollar amount, excess plan with an integration level corresponding to the Social Security taxable wage base, excess plan utilizing both types of integration levels, combination offset and excess plan with an integration level of a prespecified dollar amount, and combination offset and excess plan with an integration level corresponding to the Social Security taxable wage base. The six categories were then partitioned into finer subclassifications by listing the specific percentage offset and/or integration level used by each plan. See Table 4.3, pp. 81-86, for the total number of plans within each subclassification. The ten plans from each industry were then selected so as to yield the most complete and representative subsample of benefits provided by integrated plans in each industry.

Subsample of Nonintegrated Plans

A subsample of seventy-five plans was also selected from the sample of 441 nonintegrated pension plans. Since this subsample was to be compared to the subsample of integrated plans and there were no integrated defined contribution plans, the twenty nonintegrated defined

TABLE 4.3
 INTEGRATED PENSION PLANS
 CLASSIFIED BY TYPE

Offset Plans	Number of Plans
Offset Based on Years of Service:	
With a Maximum Offset of--	
26%	1
34%	1
38%	1
44%	2
45%	2
49%	2
50%	161
52%	2
52.5%	1
55%	1
56%	2
60%	4
63%	1
65%	2
66.6%	1
67%	3
70%	2
74%	1
75%	5
80%	1
83.3%	4

TABLE 4.3 continued

Offset Plans	Number of Plans
Offset Based on Years of Service:	
With no Maximum Offset	20
Total Offset Plans Based on Years of Service	<u>220</u>
Flat Percentage Offset of--	
20%	1
40%	1
50%	34
55%	1
59%	1
65%	1
75%	1
83.3%	1
Total Flat Percentage Offset Plans	<u>41</u>
Flat Dollar Offset of--	
\$1,212	1
1,297	1
1,320	2
1,776	2
2,592	1
Total Flat Dollar Offset Plans	<u>7</u>
Total Offset Plans	<u>268</u>

TABLE 4.3 continued

Excess Plans	Number of Plans
One Integration Level:	
Prespecified Dollar Amount--	
\$1,200	2
3,000	3
3,600	1
4,000	1
4,200	9
4,800	15
5,000	1
6,000	6
6,600	20
6,800	1
7,200	2
7,800	15
8,000	2
9,000	7
9,600	1
10,000	2
10,300	1
10,800	3
12,000	3
13,200	1
14,100	1
15,300	1
15,660	1
20,400	1
22,800	1
22,896	1
29,700	2
Total Prespecified Dollar Amount Excess Plans	<u>104</u>

TABLE 4.3 continued

Excess Plans	Number of Plans
One Integration Level:	
Social Security Taxable Wage Base--	
each year worked	25
career average at age 65	60
average during last ____ years	
1	3
3	2
5	4
10	1
average from 19 ____ to retirement	
51	6
59	2
75	1
Total Social Security Taxable Wage Base Excess Plans	<u>104</u>
Total One Integration Level Excess Plans	<u>208</u>
Two Integration Levels	
\$3,000, Social Security taxable wage base each year worked	2
\$10,800, average Social Security taxable wage base for last 5 years worked	1
Total Two Integration Level Excess Plans	<u>3</u>
Total Excess Plans	<u>211</u>

TABLE 4.3 continued

Combination Plans	Number of Plans
Offset Based on Years of Service with a Maximum, Prespecified Dollar Amount Excess:	
50%, \$3,000	1
50%, \$4,800	1
50%, \$6,000	1
50%, \$6,600	1
50%, \$7,200	1
50%, \$22,896	1
50%, \$24,100	1
50%, \$50,000	2
75%, \$3,000	1
Total Combination Plans Based on Years of Service with a Maximum Offset and Prespecified Dollar Amount Excess	<u>10</u>
Flat Percentage Offset Prespecified Dollar Amount Excess:	
40%, \$4,800	1
45%, \$6,600	2
50%, \$6,500	1
52%, \$9,000	1
65%, \$4,800	1
67%, \$4,800	1
75%, \$3,000	1
75%, \$7,800	2

TABLE 4.3 continued

Combination Plans	Number of Plans
Total Combination Plans with a Flat Percentage Offset and Prespecified Dollar Amount Excess	<u>10</u>
Offset Based on Years of Service with a Maximum Social Security Taxable Wage Base Excess:	
50%, wage base each year worked	<u>4</u>
Flat Percentage Offset, Social Security Taxable Wage Base Excess:	
64%, career average at age 65	3
66%, wage base each year worked	1
Total Combination Plans with a Flat Percentage Offset and Social Security Taxable Wage Base Excess:	<u>4</u>
Total Combination Plans	<u>28</u>
Total Integrated Pension Plans	<u>507</u>

contribution plans were excluded from the selection. Thus, seventy-five nonintegrated defined benefit plans were selected so that the benefits from actual integrated and nonintegrated plans could be compared.

The significant variables affecting the level of benefits provided by the nonintegrated plans were limited. Thus, seventy-five nonintegrated plans were selected randomly from the remaining 421 plans. The random selection was done by numbering the plans from 1 to 421 and then using a three digit random number table.⁵ Five hundred was subtracted from any digit between 501 and 999 to double the number of usable random numbers selected from the table. As a result, the subsample is composed of the nonintegrated defined benefit plans corresponding to the first nonrepeating seventy-five random numbers selected from the table.

The representativeness of the subsample was checked by determining the total number of defined benefit plans in the sample which utilized alternative benefit formulas and ascertaining whether a proportional amount of these plans ended up in the subsample. Eighty-three of the 421 plans or 19.7 percent of the plans in the sample used alternative formulas. Correspondingly, fifteen of the seventy-five plans or 20 percent of the plans in the subsample contained alternative formulas. Thus, the randomly selected subsample seemed representative of the sample.

One modification to the subsamples of actual integrated and nonintegrated pension plans was made before the plans were programmed into the model. Some of the plan formulas included benefits expressed as flat dollar amounts. These dollar amounts are the ones that appeared in the 1981 written plan provisions. For employees retiring in 1984 it is assumed that no adjustment has been made to the dollar amounts specified. However, for employees retiring in 1994, 2009, and 2019 the dollar amounts are multiplied by projected consumer price index adjustment factors. These factors are based on the projected nominal income growth rates that appear in Table 4.4, p. 89. They are calculated as the change in the projected, average income growth rates from 1984 to 1994, 2009, and 2019 and are 1.628, 2.932, and 4.341, respectively. These adjustments were made because assuming the flat dollar amounts specified in the 1981 plan provisions would remain unmodified that far into the future may be unrealistic. The complete subsamples of actual integrated and nonintegrated pension plans and their modifications that were programmed into the model can be found in Appendices IV and V, pp. 180-193.

Variable Specification

Once the actual pension formulas and their appropriate conversions were programmed into the microsimulation model, employee characteristics must be specified in order to begin calculating benefits. As indicated earlier, the simulation

TABLE 4.4

HISTORICAL AND PROJECTED NOMINAL INCOME GROWTH RATES

Year	Growth Rate	Year	Growth Rate
1944	1.017	1982	1.074
1945	1.023	1983	1.075
1946	1.085	1984	1.077
1947	1.143	1985	1.069
1948	1.078	1986	1.061
1949	.9903	1987	1.056
1950	1.0098	1988	1.054
1951	1.079	1989	1.051
1952	1.022	1990	1.047
1953	1.008	1991	1.042
1954	1.005	1992	1.040
1955	.996	1993	1.040
1956	1.015	1994	1.040
1957	1.036	1995	1.040
1958	1.027	1996	1.040
1959	1.008	1997	1.040
1960	1.016	1998	1.040
1961	1.010	1999	1.040
1962	1.011	2000	1.040
1963	1.012	2001	1.040
1964	1.013	2002	1.040
1965	1.017	2003	1.040
1966	1.029	2004	1.040
1967	1.029	2005	1.040
1968	1.042	2006	1.040
1969	1.054	2007	1.040
1970	1.059	2008	1.040
1971	1.043	2009	1.040
1972	1.033	2010	1.040
1973	1.062	2011	1.040
1974	1.110	2012	1.040
1975	1.091	2013	1.040
1976	1.058	2014	1.040
1977	1.064	2015	1.040
1978	1.076	2016	1.040
1979	1.112	2017	1.040
1980	1.135	2018	1.040
1981	1.113	2019	1.040

is based on empirical data. Thus, distributions for employee age, salary, and years of service were developed based on a study done by the Bureau of Census entitled Patterns of Worker Coverage by Private Pension Plans.⁶

As part of its May 1979 Current Population Survey⁷ (CPS), the Bureau of the Census conducted a special supplemental survey on the retirement plan coverage of employed workers aged fourteen and over. The supplemental survey, made under a contract with the Departments of Labor and Health and Human Services, was based on a scientifically selected CPS sample of households designed to represent the civilian noninstitutionalized population of the United States. The CPS sample is a proportionate, stratified, random sample. It is selected by first dividing the United States into primary sampling units, which are usually composed of a group of counties within the same state. The primary sampling units are then weighted according to population. This weighting is determined by the most recent census results and new building permits issued since the census was taken. Finally, within a primary sampling unit a random sample of household addresses is selected. Information concerning occupants of these households is then obtained through personal visits by Census Bureau interviewers utilizing standard interview questionnaires. This particular study considers the characteristics of covered and noncovered, private and public, wage and salary workers. Data on the following characteristics, as well as private

pension plan coverage, are included in the survey: age, race, sex, industry of employment, occupation, tenure of employment, earnings, size of employing establishment, and union representation.

The data from the Patterns of Worker Coverage⁸ survey were arranged on a computer tape with a separate record for each individual household member interviewed. There were 27,253 records with 792 characters per record. Since this study is concerned with representative characteristics of employees covered by actual integrated pension plans, the group of individual records was first selected off the tape that indicated the worker was not self-employed and his or her employer had a pension plan. This resulted in 14,591 records.

Employees were selected whose employer had pension plans whether they were participating in the plans or not. Limiting the sample to employees who were participating in their employer's pension plan would exclude employees who may not be participating due to integration. To make a complete comparison of benefits provided to employees by actual integrated plans and those that would be provided to these same employees by actual nonintegrated plans, as well as equivalent-nonintegrated plans and equivalent-modified-integrated plans, the characteristics of employees who may not receive any benefits from their employer's pension plan due to integration should be included in the study.

These 14,591 employee records were further reduced to a group of 10,475 records by determining the classification of each worker. Those who worked for a federal, state, or local government organization were excluded, and only those who worked in private industry were retained. This was done because all of the actual pension plans included in the model covered private-sector employees.

To make the employee profiles more representative of the workers actually employed by the establishments maintaining the integrated pension plans used in the model, several other characteristics were also matched. Thus, the 3,718 employee records were selected from the group of 10,475 records which indicated (1) the employee worked full-time for the employer; (2) the employee was between the ages of twenty-five and sixty-five in 1979; (3) the employing establishment's size was greater than twenty-five employees; and (4) the employee was not represented by a union. The full-time and age requirements were designed to yield representative characteristics of employees who would be retiring with possible coverage from the integrated plans from 1984 to 2019. Many plans specifically exclude part-time workers from participation. The employer establishment size categories used to code the Patterns of Worker Coverage⁹ survey data were less than 25, 25-99, 100-499, 500-999, and greater than 1,000 employees. The 1981 Level of Benefits Study's¹⁰ scope was limited to establishments employing at least fifty employees. A perfect match could

not be obtained due to the different size classifications. However all of the employees working at establishments with less than twenty-five other employees could definitely be excluded. Finally, employees were excluded from the subsequent analysis who were represented by a union because 94 percent of the integrated plans included in the 1981 Level of Benefits Study¹¹ sample and 97 percent of the integrated plans included in the subsample covered nonunion employees.

To develop diverse profiles of employee characteristics that could be manageably used as input for the microsimulation model, four age groups among the 3,718 employee records were focused on. Employees that were twenty-five, thirty-five, fifty, and sixty in 1979 were selected and first sorted by industry, age, and annual salary. This sorting process resulted in very small and unequal sample sizes for each industry. For example, the construction industry only had two, two, one, and one employee(s) in each respective age group, while the services industry had twenty-nine, twenty-nine, eleven, and thirteen employees in each respective age group. There also did not seem to be any significant difference in the salary ranges for each age group based on industry. Therefore, the employee profiles matched with the pension plans in the model in order to calculate expected benefits will not vary depending on the industry of the plan.

The employees in the four age groups were then sorted by age and annual salary. Thirty employees were deleted

from the subsequent analysis because their annual salary was less than \$6,000. This deletion was done to exclude workers from the study who would most likely receive supplemental welfare payments following retirement. There were then one hundred and twenty-seven employees in the twenty-five-year-old age group, one hundred and six employees in the thirty-five-year-old age group, sixty-six employees in the fifty-year-old age group, and fifty employees in the sixty-year-old age group. Next, a low, median, and high annual salary was calculated for each of the four age groups. The low salary is an average of the bottom 33 percent of the salaries in each age group. Similarly, the median and high salaries are an average of the middle 20 percent and top 10 percent of the salaries in each age group. These percentages were based on apparent natural breaks in the salary distributions. The salary levels determined for each age group are included in Chapter I and appear again below.

<u>Salary Level</u>	<u>Age</u>			
	25	35	50	60
Low	\$ 7,000	\$ 9,000	\$ 9,000	\$ 8,000
Median	11,000	15,000	18,000	15,000
High	21,000	37,000	40,000	42,000

Once representative age and salary distributions were determined, representative employment tenure characteristics must also be determined for employees covered by private pension plans. This was done by starting with the group of 3,718 employees between the ages of twenty-five and sixty-five, whose selection was discussed previously, and excluding all employees below age sixty. Thus, 177

employees between the ages of sixty and sixty-five were retained. Another eleven employees were excluded, however, because they indicated that they were included in a plan from a previous job other than their present one and their length of service with their present employer was less than ten years. This was done because the length of service with previous employers was not included as a survey response, and it was felt that the length of service with the present employer was not representative of the employment tenure that would determine these employees' ultimate expected private pension benefit.

The 166 remaining employees were sorted by age and annual salary with their years of service printed alongside. There was no consistent correlation between the salary and years-of-service levels. Five, four, three, two, and one year(s) of service were added then to the employment tenure of the sixty, sixty-one, sixty-two, sixty-three, and sixty-four-year-old age groups, respectively. It was assumed that these employees would remain at their present jobs until reaching age sixty-five in order to increase the sample size. The 166 employees were sorted then just by employment tenure. A representative low, average, and high years-of-service level at normal retirement was calculated. The low tenure is an average of the bottom 25 percent of the years-of-service levels; the average tenure is a simple average of all 166 of the years-of-service levels; and the high tenure is an average of the top 25 percent of the

years-of-service levels. This resulted in employment tenure levels of nine, twenty-five, and forty-one years of service. Thus, there are thirty-six different employee profiles composed of year of retirement (based on age in 1979), salary, and years of service at normal retirement to be used as inputs to the model for each pension plan analyzed. The model will yield 2,700 (75×36) pension benefit observations for the three samples of seventy-five integrated, nonintegrated, and equivalent-nonintegrated pension plans. Likewise, the model will yield 864 (24×36) pension benefit observations for the sample of twenty-four modified-integrated pension plans.

Before any further employee variables may be specified, the twelve 1979 annual salaries must be projected backwards and forward to generate a lifetime earnings pattern. The compensation bases for the pension benefit formulas built into the microsimulation model are based on the earnings at retirement, or on the total or the average earnings for some time period that does not exceed the employee's career length with the firm. Also, the primary insurance amount, that is used to calculate the offset for the pension plans integrated using the offset method, is based on an employee's earnings from age twenty-two to sixty-five. Thus, each salary level within each age group was projected back to the year that particular age group was twenty-two years of age and forward to the year they would reach sixty-five years of age. For example, the three salary levels within the

twenty-five year old age group were projected backwards to the year 1976 and forward to the year 2019. These projections were based on a combination of real annual income growth rates and either historical or future expected changes in the consumer price index.

Real annual income growth rates can be derived using two possible approaches. The first method is to base wage change estimates on specific individual attributes such as race, sex, age, education, and geographical location. The second method is to estimate wage changes based on the average experience of a large number of heterogeneous workers. Given the uncertainty as to specific relationships between worker attributes and wage growth, the extensive number of potential combinations of different sets of worker attributes, and the lack of generality that such an analysis would have, the second or "representative" approach was used in this study. These representative growth rates will, however, be modified for age differentials. The following average annual growth rates of mean family income over the past twenty years which have been compiled by the Bureau of the Census are used:¹²

<u>Age of Family Head</u>	<u>Annual Growth Rate of Real Mean Family Income</u>
25-34	2.00%
35-44	2.25%
45-54	2.75%
55-64	2.75%

Although these growth rates are for family income, rather than strictly wage earnings, the Bureau of the Census

reports that "it has been determined that income earned from wages or salaries is much better reported than other sources of income, and is nearly equal to independent estimates of aggregate income."¹³ Thus, the use of these growth rates for wage earnings seems justified.

These real annual income growth rates were then added to historical and future expected changes in the consumer price index, yielding a composite growth rate on which to base the salary projections. The composite growth rate then reflects both real changes in salary due to such things as promotions, raises, and bonuses and changes in salary due to cost-of-living adjustments. The historical changes in the consumer price index were taken from Statistical Abstracts of the U.S.^{14,15} compiled by the Bureau of the Census. The expected future changes in the consumer price index were based on the intermediate assumptions of the 1982 Annual Report of the Social Security Board of Trustees.¹⁶ A summary of both the historical and projected nominal income growth rates used is found in Table 4.4, p. 89. In order to project the 1979 annual salaries, the appropriate real income growth rate for whatever age each employee would be in a given year is added to the nominal income growth rate, or change in the consumer price index, determined for that particular year. For example, when the twenty-five-year-old age group's 1979 salary is projected to 1980, a growth rate of 2 percent (real income growth rate for age twenty-five) plus 13.5 percent (nominal income growth rate or change in

the consumer price index for 1980) is used. See Appendix VI, p. 194, for a complete list of the twelve salary projections for each year of retirement or age group and salary level.

One final employee characteristic must be specified before private pension benefits can be calculated using the microsimulation model. This is the Social Security primary insurance amount that is subtracted from the gross pension benefit for formulas integrated under the offset method. As indicated earlier, the primary insurance amount is based on the year an employee reaches retirement age and on an employee's earnings from age twenty-two to the year of retirement. This study assumes that all employees retire at the age of sixty-five. Using the twelve lifetime earnings patterns included in Appendix VI, p. 194, as input, twelve primary insurance amounts were computed using the benefit computation computer program developed by the Office of the Actuary of the Social Security Administration.¹⁷ The same economic projections for changes in the consumer price index used to project future salary levels were built into this program. The program also yielded expected future Social Security taxable wage bases based on these same economic projections that were derived from the 1982 Annual Report of the Social Security Board of Trustees.¹⁸ The projected Social Security taxable wage bases appear along with the historical levels in Appendix I, p. 176, and are used to

specify the integration level for pension plan formulas integrated under the excess method.

A final step in the variable specification process must be performed. The employee characteristics of compensation base and years of service must be converted to the forms specified by the pension plans analyzed. Also, integration level forms specified by the plans which are dependent on the Social Security taxable wage base over some period of the employee's working career must be calculated based on historical and projected wage bases. The forms of the compensation base, years of service, and integration level variables specified by the pension plans used in the model are included in the definition of variables for the actual integrated and nonintegrated plans that appear in Appendices IV and V, pp. 180-193. The other groups of plans analyzed in the model are derivations of the actual integrated plans, and thus the forms of the variables that must be specified are the same.

These conversions were accomplished by taking the thirty-six employee profiles (based on retirement year, earnings level, and years of service combinations) and calculating the values for each of the variables used in the model. For example, if an employee profile is selected where the year of retirement is 2019, the earnings level is low, and the years of service with the employer maintaining the pension plan are nine. Then average annual compensation over an employee's highest three years (AAC3) is calculated

as the average of the earnings amount in 2017, 2018, and 2019 specified in this profile. Similar calculations are made for the integration level forms specified by the plans.

Once the model has been completely specified, the expected benefits for the four groups of pension plans and thirty-six employee profiles can be calculated. The results and their analysis are presented in Chapter V.

Notes

¹Alicia Munnell, The Economics of Private Pensions (Washington, D.C.: Brookings Institution, 1982) pp. 23-25.

²I.R.C. Sections 415(d)(1)(A) and (d)(3).

³Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).

⁴Ibid.

⁵George W. Snedecor and William G. Cochran, Statistical Methods (Ames, Iowa: Iowa State University Press, 1980) pp. 463-466.

⁶Daniel J. Beller, Patterns of Worker Coverage by Private Pension Plans (Washington, D.C.: U.S. Department of Labor, 1980).

⁷For a description of and summary of the statistics developed from the 1979 Current Population Survey see U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 352 and Series P-60, Nos. 126, 129, and 130 (Washington, D.C.: U.S. Government Printing Office, 1980 and 1981).

⁸Ibid.

⁹Ibid.

¹⁰Employee Benefits, U.S. Department of Labor.

¹¹Ibid.

¹²U.S. Bureau of the Census, "Illustrative Projections of Money Income Size Distributions for Households: 1980 to

1995," Current Population Reports, Series P-60, No. 123 (Washington, D.C.: U.S. Government Printing Office, 1980) p. 3.

¹³Ibid., p. 124.

¹⁴U.S. Bureau of the Census, Historical Statistics of the U.S., Colonial Times to 1970, Part I (Washington, D.C.: U.S. Government Printing Office, 1975) p. 210.

¹⁵U.S. Bureau of the Census, Statistical Abstracts of the U.S.: 1981 (Washington, D.C.: U.S. Government Printing Office, 1981) p. 467.

¹⁶U.S. Department of Health and Human Services, Social Security Administration, 1982 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (Washington, D.C.: U.S. Government Printing Office, 1982).

¹⁷S. McKay, Computing a Social Security Benefit After the 1977 Amendments (Washington, D.C.: Social Security Administration, 1980). Professor Edmund Outslay of Michigan State University supplied and ran the computer program necessary to calculate the twelve primary insurance amounts used in this study.

¹⁸U.S. Department of Health, 1982 Annual Report of the Board of Trustees.

CHAPTER V
SIMULATION RESULTS

Research Question 1

The purpose of research question one is to ascertain whether there are any significant identifying characteristics of integrated pension plans. The characteristics examined were unionization of participants, geographic region, and industry classification. The complete sample of 963 pension plans contained in the Level of Benefits Study¹ was used for this analysis. There were 522 integrated pension plans and 441 nonintegrated pension plans.

Each plan was classified according to the three characteristics examined. A binomial test was used to determine whether any of the characteristics were significantly different among the two types of pension plans. The relevant hypotheses tested were stated as follows:

- H_{0A} : The true proportion of integrated plans which are unionized equals the true proportion of nonintegrated plans which are unionized.
- H_{1A} : The true proportion of integrated plans which are unionized does not equal the true proportion of nonintegrated plans which are unionized.
- H_{0B} : The true proportion of integrated plans located in each geographic region equals the true proportion of nonintegrated plans located in each geographic region.

- H_{1B} : The true proportion of integrated plans located in each geographic region does not equal the true proportion of nonintegrated plans located in each geographic region.
- H_{0C} : The true proportion of integrated plans within each industry classification equals the true proportion of nonintegrated plans within each industry classification.
- H_{1C} : The true proportion of integrated plans within each industry classification does not equal the true proportion of nonintegrated plans within each industry classification.

Approximately 6 percent of the integrated pension plan participants were members of a union, whereas approximately 59 percent of the nonintegrated pension plan participants were members of a union. This difference is significant below a .0001 significance level. These results are summarized in Table 5.1.

There were four geographic region classifications. The states included in each classification are listed below:

Northeast.--Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

South.--Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

North Central.--Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

West.--Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

The proportion of integrated pension plans found in the South and North Central regions are significantly different from the proportion of nonintegrated pension plans found in

TABLE 5.1
A COMPARISON OF THE UNIONIZATION OF
INTEGRATED AND NONINTEGRATED
PENSION PLAN PARTICIPANTS

Unionization of Participants	Integrated Pension Plans	
	Number	Proportion
Union	31	.059 ^a
Nonunion	<u>491</u>	<u>.941</u>
Total	522	1.000

Unionization of Participants	Nonintegrated Pension Plans	
	Number	Proportion
Union	258	.585 ^a
Nonunion	<u>183</u>	<u>.415</u>
Total	441	1.000

^aDenotes a significant difference that is below a .0001 significance level.

these two regions. Approximately 30 percent of the integrated plans had been adopted by employers located in the South, while approximately 21 percent of the nonintegrated plans had been adopted by employers located in the South. Approximately 24 percent of the integrated plans were classified in the North Central region, while approximately 35 percent of the nonintegrated plans were classified in this region. These differences are significant below significance levels of .003 and .0003, respectively. The difference in the proportion of integrated and nonintegrated pension plans classified in the Northeast and West regions are not significantly different. A summary of the geographic region classification is found in Table 5.2.

There is a significant difference among the proportion of integrated and nonintegrated pension plans classified in two of the eight industry groups. The manufacturing classification comprised approximately 54 percent of the integrated plans and 66 percent of the nonintegrated plans. Also, nearly 18 percent of the integrated plans were from the finance, insurance, and real estate industry, while only about 3 percent of the nonintegrated plans were classified in this industry group. These differences are significant below significant levels of .0002 and .0001, respectively. The differences among the proportion of the two types of plans classified in the other six industries is not significantly different. A summary of the industry classification is found in Table 5.3.

TABLE 5.2

A COMPARISON OF THE GEOGRAPHIC REGION
OF INTEGRATED AND NONINTEGRATED
PENSION PLANS

Geographic Region	Integrated Pension Plans	
	Number	Proportion
Northeast	153	.293 ^b
South	159	.305 ^b
North Central	123	.236 ^c
West	82	.157
Nonresponse ^a	5	.009
Total	522	1.000

Geographic Region	Nontegrated Pension Plans	
	Number	Proportion
Northeast	118	.268 ^b
South	95	.215 ^b
North Central	154	.349 ^c
West	60	.136
Nonresponse ^a	14	.032
Total	441	1.000

^aThere were five integrated and fourteen nonintegrated pension plans that had not been classified into any one of the four geographic regions.

^bDenotes a significant difference that is below a .003 significance level.

^cDenotes a significant difference that is below a .0003 significance level.

TABLE 5.3

A COMPARISON OF THE INDUSTRY CLASSIFICATION
OF INTEGRATED AND NONINTEGRATED
PENSION PLANS

Industry Classification	Integrated Pension Plans		Nonintegrated Pension Plans	
	Number	Proportion	Number	Proportion
Mining	11	.021	6	.014
Construction	5	.010	20	.045
Manufacturing	281	.538 ^a	290	.658 ^a
Transportation & Communication	51	.098	57	.129
Wholesale Trade	25	.048	10	.023
Retail Trade	41	.078	35	.079
Finance, Insurance, & Real Estate	92	.176 ^b	14	.032 ^b
Services	<u>16</u>	<u>.031</u>	<u>9</u>	<u>.020</u>
Total	522	1.000	441	1.000

^aDenotes a significant difference that is below a .0002 significance level.^bDenotes a significant difference that is below a .0001 significance level.

Generally, the differences in the three characteristics examined among integrated and nonintegrated pension plans are significant. The results are also consistent. Significantly fewer of the integrated pension plans are unionized, while significantly more of the integrated plans are in the South and significantly fewer of the integrated plans are in the North Central. Similarly, significantly fewer of the integrated plans are from the manufacturing industry and significantly more of these plans are from the finance, insurance, and real estate industry. This result is consistent with the expectation of unions being more prevalent in the North Central region and the manufacturing industry and less prevalent in the South and the finance, insurance, and real estate industry.

Research Question 2.A.

Research question 2.A compares the expected benefits from seventy-five actual integrated pension plans to the expected benefits from a random sample of seventy-five actual nonintegrated pension plans. The research question is stated as follows: Are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from a random sample of nonintegrated pension plans?

Thirty-six different benefits were calculated for each of the seventy-five plans based on the thirty-six different employee profiles discussed in Chapter IV, pp. 88-101. This

resulted in two independent samples of 2,700 benefit observations each. The 2,700 expected benefits were comprised of benefit observations for four different retirement dates--1984, 1994, 2009, and 2019. The benefits were expressed in inflated dollars used to reflect anticipated nominal income growth rates. Thus, all of the benefit observations were deflated to 1984 dollars using the adjustment factors in Chapter IV, p. 88.

The mean integrated benefit was \$12,484, while the mean nonintegrated benefit was \$5,951. The minimum and maximum integrated benefits were \$2,399 and \$34,356, respectively, while the minimum and maximum nonintegrated benefits were \$600 and \$22,445, respectively.

The significance of the difference between the means of the integrated and nonintegrated benefit samples was determined using a t-test. The appropriate test statistic for this calculation, however, depends on whether it can be assumed that the variances of the two samples are equal.² Therefore, an F-test was used to test the following hypothesis:

H_0 : The variance of the integrated benefits equals the variance of the nonintegrated benefits.

The test statistic is given by³

$$F = (\text{larger of } S_1^2, S_2^2) / (\text{smaller of } S_1^2, S_2^2)$$

where

S_1^2 = the variance of the integrated benefit sample, and
 S_2^2 = the variance of the nonintegrated benefit sample.

The value of this test statistic was 1.30. The probability of getting an F-value greater than this is .2625. Therefore, the null hypothesis cannot be rejected, and the appropriate t-test was used to reflect that the variances can be assumed to be equal.

The following test statistic determines the difference between the means of the integrated and nonintegrated benefit samples:⁴

$$t = (\bar{X}_1 - \bar{X}_2) / \sqrt{S^2(1/n_1 + 1/n_2)}$$

where

\bar{X}_1 and \bar{X}_2 represent the means of the two samples,

S^2 represents the pooled variances of the two samples and is equal to

$$[(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2] / (n_1 + n_2 - 2),$$

S_1^2 and S_2^2 represent the variances of the two samples, and

n_1 and n_2 represent the two sample sizes.

The test statistic was equal to 7.9443, and the probability of a t-value greater than this is .0001. Thus, the mean integrated benefit is significantly greater than the mean nonintegrated benefit at a significance level of .0001.

The means of the various industry, salary, age, and employment tenure groups were compared among the integrated and nonintegrated samples. The results of this comparison appear in Table 5.4. The mean annual integrated benefit is greater than the mean annual nonintegrated benefit for every characteristic group examined.

TABLE 5.4

A COMPARISON OF ACTUAL INTEGRATED
AND NONINTEGRATED PENSION
PLAN BENEFITS

Characteristic Group	Mean Annual Benefit	
	Integrated Plans	Nonintegrated Plans
Industry		
Mining	\$12,978	\$7,484
Construction	10,692	6,651
Manufacturing	11,319	5,272
Transportation & Communication	16,256	4,229
Wholesale Trade	12,171	6,474
Retail Trade	9,591	7,697
Finance, Insurance, & Real Estate	13,321	4,551
Services	12,649	5,596
Salary		
Low	\$ 4,558	\$4,130
Median	8,693	5,204
High	24,201	8,517
Age ^a		
Sixty	\$ 8,583 ^b	\$4,951 ^c
Fifty	12,903 ^b	5,929 ^c
Thirty-five	16,731 ^b	6,940 ^c
Twenty-five	11,719 ^b	5,983 ^c

TABLE 5.4--continued

Characteristic Group	Mean Annual Benefit	
	Integrated Plans	Nonintegrated Plans
Employment Tenure		
Nine Years	\$ 5,184	\$1,698
Twenty-five Years	13,271	6,669
Forty-one Years	18,997	9,485

a 1984, 1984, 2009, and 2019 are the years of retirement for the sixty, fifty, thirty-five, and twenty-five age groups, respectively. The age groups correspond to years-of-age in 1979.

b The mean annual integrated benefits for retirement years 1994, 2009, and 2019 were \$21,006, \$49,055, and \$50,874, respectively, before being deflated to 1984 dollar levels.

c The mean annual nonintegrated benefits for retirement years 1994, 2009, and 2019 were \$9,652, \$20,348, and \$25,972, respectively, before being deflated to 1984 dollar levels.

Among the industry groups the greatest relative difference between the annual benefits expected from the two types of plans is in the transportation and communication industry. The mean annual nonintegrated benefit is only 26 percent of the mean annual integrated benefit. The smallest relative difference among the industry groups is in the retail trade industry where the mean nonintegrated benefit is 80 percent of the mean integrated benefit.

Among the salary groups the high salary classification displays the greatest relative difference among the means of the two types of plan benefits. The mean nonintegrated benefit for the low salary group is 91 percent of the mean integrated benefit for this group. This percent decreases to 60 percent for the median salary group and decreases to 35 percent for the high salary group.

There is less variance between the mean annual integrated and nonintegrated benefit for the four age groups examined. The mean nonintegrated benefit ranges from 41 percent to 58 percent of the mean integrated benefit for each age group.

The mean nonintegrated benefit for the nine year employment tenure group is only 33 percent of the mean integrated benefit for this group. However, this percentage rises to 50 percent for both the twenty-five and forty-one employment tenure groups.

Upon examination of the results from the three employee characteristics analyzed--salary, year of retirement, and

employment tenure--the greatest relative difference between the mean nonintegrated benefits and the integrated benefits is in the high salary group and the low employment tenure group. This result is expected since the integration laws are structured so that the higher salaried employees receive a greater proportion of their preretirement salary in private pension benefits than the lower salaried employees. Also, a greater proportion of the nonintegrated benefit formulas than the integrated benefit formulas are based solely on years-of-service at retirement rather than both salary and years-of-service at retirement. Further, many of the nonintegrated plans pay no benefits to employees with less than ten years-of-service at retirement.

The mean integrated and nonintegrated benefit was also determined for each salary group using only employee profiles with a retirement date of 1984. There were 675 benefit observations in this subsample. These employees were focused on separately to isolate the difference in integrated and nonintegrated benefits for current retirees. These results will not be confounded by anticipated inflation rates, anticipated Social Security benefit levels, or anticipated Social Security tax rates. The mean integrated benefit for the 1984 retirees was \$8,583 and the mean nonintegrated benefit was \$4,951.

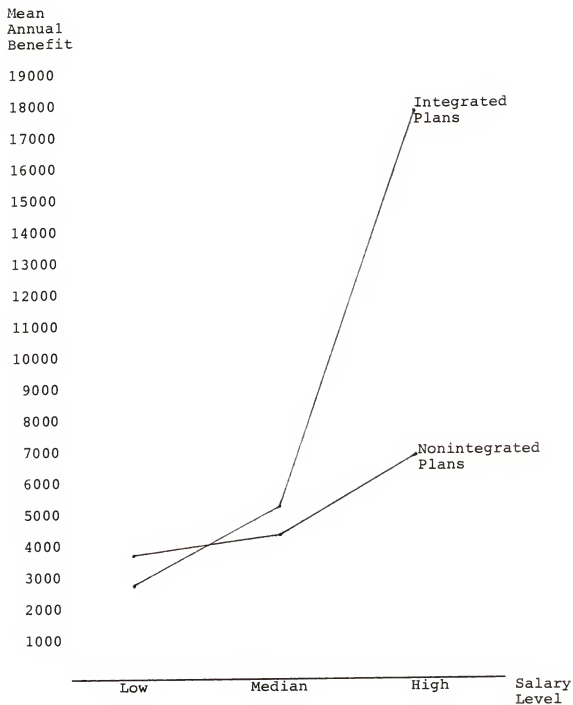
The distribution of the mean integrated and mean nonintegrated benefits of the 1984 retirees by salary level is particularly interesting. The mean integrated benefits

for the low, median, and high salary levels were \$2,544, \$5,018, and \$18,186, respectively. Whereas, the mean nonintegrated benefits for each salary level were \$3,526, \$4,246, and \$7,082, respectively. Figure 5.1 graphically displays these results. The mean nonintegrated benefit was greater than the mean integrated benefit for the low salary level for this group of retirees. This is contrary to the rank of the two means for the low salary level using the complete sample of all four retirement dates. The mean integrated benefit was higher than the mean nonintegrated benefit for the median and high salary levels. This is consistent with the results obtained using the complete sample.

Research Question 2.B.

Research question 2.B continues the comparison of the current integrated tax subsidy to a tax subsidy that is proportional to wage income. The degree that integration causes our tax subsidy to deviate from proportionality is measured by comparing actual integrated pension benefits to equivalent-nonintegrated pension benefits. The research question is stated as follows: Are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from equivalent-nonintegrated pension plans?

All variables remain constant among the two groups of plans except whether the benefit formula is integrated or



A COMPARISON OF INTEGRATED AND NONINTEGRATED
PENSION BENEFITS FOR 1984 RETIREES

FIGURE 5.1

nonintegrated. Thus, two related samples of 2,700 benefit observations each are employed in this analysis. These observations, like those employed in research question 2.A, were also deflated to 1984 dollar levels.

The mean equivalent-nonintegrated benefit was \$14,556. This is \$2,072 greater than the mean integrated benefit, which was \$12,484.

The significance of the difference between the means of the two samples was determined using a t-test. The appropriate test statistic for the comparison of two related samples is given by⁶

$$t = \frac{\bar{d}}{\sqrt{\frac{s_d^2}{n}}}$$

where

\bar{d} is the mean of the individual differences between the paired measurements,

s_d^2 is the variance of the individual differences between the paired measurements, and

n equals the number of paired measurements.

The test statistic was equal to 34.61, and the probability of a t-value greater than this is .0001. Thus, the mean equivalent-nonintegrated benefit is significantly greater than the mean integrated benefit at a significance level of .0001. Research question three further analyzes the difference among these two samples according to industry and characteristics of workers currently covered by pension plans.

Research Question 3

Research question 3.A examines the differences across industry groups in the integrated benefits and the equivalent-nonintegrated benefits. The research question is stated as follows: Are there significant differences across industry groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the equivalent-nonintegrated formulas?

The mean integrated benefits and equivalent-nonintegrated benefits for each industry group and their differences are shown in Table 5.5. An analysis of variance was done to determine if the discrepancies in the means are significantly different across industry groups. An F-test was used to test the following null hypothesis:

H_0 : The mean differences in integrated benefits and equivalent-nonintegrated benefits are equal across industry groups.

The test statistic is given by⁷

$$F = \frac{MSTR}{MSE}$$

where

MSTR represents the mean square due to treatments, and

MSE represents the mean squared error.

The value of this test statistic was 12.01. The probability of getting an F-value greater than this is .0001. Therefore, the null hypothesis was rejected. There are significant differences across industry groups in the reduction in pension benefits due to existing integrated pension formulas

TABLE 5.5

A COMPARISON ACROSS INDUSTRY GROUPS
OF INTEGRATED AND EQUIVALENT-NONINTEGRATED
PENSION PLAN BENEFITS

Industry	Mean Annual Benefit		Mean Difference
	Integrated Plans	Equivalent-Nonintegrated Plans	
Mining	\$12,978	\$14,841	\$1,863
Construction	10,692	12,691	1,999
Manufacturing	11,319	13,201	1,882
Transportation & Communication	16,256	19,553	3,297
Wholesale Trade	12,171	14,598	2,427
Retail Trade	9,591	11,269	1,678
Finance, Insurance, & Real Estate	13,321	15,185	1,864
Services	12,649	14,183	1,534

rather than pension benefit formulas which are proportional to wage income for all salary levels.

Although the F-test indicates that the mean differences across industry groups are not equal, it does not necessarily follow that the eight mean differences are all unequal, even though this may well be true. The next stage of the analysis is to determine which industry mean differences are different. Repeated application of the t-test to all possible pairs of industry mean differences is discouraged since this procedure gives a large probability of getting one or more false positives (declaring two industry mean differences to be different when they are, in fact, equal).⁸ Special techniques called multiple comparison procedures are available for this purpose.

The multiple comparison procedure used in this study is Duncan's multiple range test.⁹ It was selected because of its power.¹⁰ There is a large probability of detecting significant differences when they exist. First, the means being analyzed are ranked from largest to smallest. Then the equality of two means is tested by referring the difference to tabled critical points. The critical point values depend on the range of the ranks of the two means tested. As the range becomes larger, so does the tabled critical point.¹¹

The results of Duncan's multiple range test on the mean difference in integrated and equivalent-nonintegrated benefits across industry groups is shown in Table 5.6. An

TABLE 5.6

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION
BENEFITS ACROSS INDUSTRY GROUPS

Industry	Mean Difference	Duncan Group ^a
Transportation & Communication	\$3,297	A
Wholesale Trade	2,427	B
Construction	1,999	B C
Manufacturing	1,882	C
Finance, Insurance, & Real Estate	1,864	C
Mining	1,863	C
Retail Trade	1,678	C
Services	1,534	C

^aMeans with the same letter are not significantly different at a significance level of 5 percent.

alpha level of 5 percent is used in determining which means are significantly different. The mean differences are listed from largest to smallest. Those means which appear in a different Duncan group are significantly different. Thus, those means with the same Duncan group letter are not significantly different.

The mean difference in the transportation and communication industry is significantly higher than the mean difference in the other seven industries. Thus, the integrated plans in this industry are less proportional to each employee salary level than the integrated plans in any of the other industries. It is not surprising that this industry also is characterized by the largest mean annual integrated benefit (see Table 5.5, p. 120). The lack of proportionality in integrated pension plans is due to the fact that the higher salaried employees receive a greater proportion of their preretirement wages in pension benefits than the lower salaried employees. The lack of proportionality in the transportation and communication industry is increased as the higher salaried employees receive greater proportional benefits. This, in turn, raises the mean annual benefit in this industry.

The mean differences in the wholesale trade and construction industries are not significantly different. However, they are significantly lower than the mean difference in the transportation and communication industry. The wholesale trade industry mean difference is significantly

higher than the mean differences in the manufacturing, finance, insurance, and real estate, mining, retail trade, and service industries. The construction industry mean difference, however, is not significantly higher than the mean difference in these other five industries. It falls in both the B and C Duncan groups.

For research questions 3.B, 3.C, and 3.D the analysis performed on the differences across industry groups between integrated and equivalent-nonintegrated pension benefits was repeated for the differences across salary, age, and employment tenure groups.

Research question 3.B analyzes the differences across salary groups and is stated as follows: Are there significant differences across salary groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the equivalent-nonintegrated formulas?

The F-test, used to test whether the mean differences in the two types of benefit formulas were different across salary groups, yielded a test statistic value of 17.00. This value is significant below a significance level of .0001. Thus, there are significant differences across salary groups in the reduction in pension benefits due to existing integrated pension formulas rather than equivalent-nonintegrated formulas which are proportional to wage income for all wage levels. Duncan's multiple range test was again used to determine which salary groups were significantly different.

The absolute increase in mean benefits as a result of the equivalent-nonintegrated plan formulas is significantly higher in the median salary group than in the other two salary groups. The average pension benefit per employee in the median salary group increases by \$2,558, while the average benefit per employee in the high and low salary groups increases by \$1,888 and \$1,770, respectively. The mean difference in benefits in the high salary group is not significantly different from the mean difference in the low salary group.

In examining the differences in benefits across salary groups, relative differences (the mean difference divided by the mean integrated benefit) may be more relevant than absolute differences. By converting the integrated plan formulas to plan formulas which are proportional to wage income, the mean annual benefit for the high salary group increases by only 7 percent, while the mean annual benefits for the median and low salary groups increase by 29 and 41 percent, respectively. Suppose, Congress desires a pension benefit tax subsidy which is proportional to wage income. For integrated plans to maintain the level of private pension benefits currently paid to the highest level employees, these plans would have to pay approximately 30 percent more to the median-paid employees and approximately 40 percent more to the low-paid employees. Thus, it seems that integration has allowed the current tax subsidy to deviate

substantially from proportionality. Tables 5.7 and 5.8 summarize the preceding results.

Research question 3.C examines the differences in benefits across age groups and is stated as follows: Are there significant differences across age groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the equivalent-nonintegrated formulas?

In this analysis all variables remain constant among the age groups except those depending on the year of retirement. The value of the F-statistic was 16.88 which is significant below a significance level of .0001. The analysis was continued to determine which age groups were significantly different.

The largest absolute difference in average equivalent-nonintegrated benefits and average integrated benefits is in the twenty-five-year-old group. It is significantly different from the other three mean differences. The relative difference is 26 percent for the sixty-year-old group and drops to 12 percent and 11 percent for the fifty-year-old group and thirty-five-year-old group, respectively. However, the relative difference rises again to 23 percent for the twenty-five-year-old group. This is consistent with the small mean annual integrated benefit for this age group. By 2019, the projected taxable wage base and Social Security benefit levels may have risen so high as to completely exclude many employees from private pension plan

TABLE 5.7
A COMPARISON ACROSS SALARY GROUPS OF INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION PLAN BENEFITS

Salary	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent- Nonintegrated Plans		
Low	\$ 4,558	\$ 6,446	\$1,888	.41
Median	8,693	11,251	2,558	.29
High	24,201	25,971	1,770	.07

TABLE 5.8

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION
BENEFITS ACROSS SALARY GROUPS

Salary	Mean Difference	Duncan Group ^a
Median	\$2,558	A
Low	1,888	B
High	1,770	B

^aMeans with the same letter are not significantly different
at a significance level of 5 percent.

participation. This decreases the average benefit per employee and increases the deviation from proportional benefits for all wage levels in this group. Tables 5.9 and 5.10 summarize the results across age groups.

Research question 3.D examines the differences in benefits across employment tenure groups and is stated as follows: Are there significant differences across employment tenure groups in the reduction in pension benefits due to the existing integrated pension formulas rather than the equivalent-nonintegrated formulas? Here, the value of the F-statistic was 127.30 which is significant below a significance level of .0001. The results are examined further to determine which employment tenure groups are significantly different.

The mean differences in employment tenure groups are all significantly different from each other. The largest difference is in the forty-one-years-of-service group, followed by the twenty-five-years-of-service group and then the nine-years-of-service group. However, here again relative differences may be more relevant than absolute differences.

The mean differences are 16 percent to 17 percent of the mean annual integrated benefits for each of three employment tenure groups. This uniformity in relative differences is expected, since the conversion of the integrated formulas to equivalent-nonintegrated formulas was done so that the benefit per year-of-service became

TABLE 5.9

A COMPARISON ACROSS AGE GROUPS OF INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION PLAN BENEFITS

Age ^a	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent- Nonintegrated Plans		
Sixty	\$ 8,583	\$10,825	\$2,242	.26
Fifty	12,903 ^b	14,439 ^c	1,536 ^d	.12
Thirty-five	16,731 ^b	18,581 ^c	1,850 ^d	.11
Twenty-five	11,719 ^b	14,381 ^c	2,662 ^d	.23

^a 1984, 1994, 2009, and 2019 are the years-of-retirement for the sixty, fifty, thirty-five, and twenty-five age groups, respectively. The age groups correspond to years-of-age in 1979.

^b The mean annual integrated benefits for retirement years 1994, 2009, and 2019 were \$21,006, \$49,055, and \$50,874, respectively, before being deflated to 1984 dollar levels.

^c The mean annual equivalent-nonintegrated benefits for retirement years 1994, 2009, and 2019 were \$23,506, \$54,480, and \$62,428, respectively, before being deflated to 1984 dollar levels.

^d The mean differences for retirement years 1994, 2009, and 2019 were \$2,500, \$5,425, and \$11,554, respectively, before being deflated to 1984 dollar levels.

TABLE 5.10

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION
BENEFITS ACROSS AGE GROUPS

Age	Mean Difference	Duncan Group ^a
Twenty-five	\$2,662	A
Sixty	2,242	B
Thirty-five	1,850	C
Fifty	1,536	C

^aMeans with the same letter are not significantly different at a significance level of 5 percent.

proportional at all salary levels. The relative difference in the mean annual equivalent-nonintegrated benefit and integrated benefit for all 2,700 paired observations is also approximately 16.6 percent (\$2,072 divided by \$12,484). Tables 5.11 and 5.12 summarize these results.

Research Question 4

Research question 4.A is stated as follows: What proportion of existing integrated pension plans would not fall within the 1978 proposed modified integration limits? For this research question, the sample of seventy-five actual integrated plans are examined to determine the number that would have to be modified to comply with the 1978 proposed integration limits. Twenty-four of the seventy-five plans or 32 percent failed to comply with the proposed limits. Since this proportion was greater than zero the analysis was done for research question 4.B.

Research question 4.B analyzes the following question: Among those integrated pension plans that exceed the modified limits, are the expected benefits of current and future retirees from integrated pension plans significantly less than their expected benefits from equivalent-modified-integrated pension plans?

In this analysis the expected benefits from the twenty-four integrated plans are compared to the benefits that would be expected from these plans if they were modified to conform to the proposed limits. The analysis

TABLE 5.11
A COMPARISON ACROSS EMPLOYMENT TENURE GROUPS OF INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION PLAN BENEFITS

Years-of- Service at Retirement	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent- Nonintegrated Plans		
Nine	\$ 5,184	\$ 6,073	\$ 889	.17
Twenty-five	13,271	15,486	2,215	.17
Forty-one	18,997	22,110	3,113	.16

TABLE 5.12

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-NONINTEGRATED PENSION BENEFITS
ACROSS EMPLOYMENT TENURE GROUPS

Years-of-Service at Retirement	Mean Difference	Duncan Group ^a
Forty-one	\$3,113	A
Twenty-five	2,215	B
Nine	889	C

^aMeans with the same letter are not significantly different
at a significance level of 5 percent.

employs two related samples of 864 observations each (24 times 36) and the paired differences. The mean equivalent-modified-integrated benefit was \$11,686. This is \$1,735 greater than the mean integrated benefit, which was \$9,951. The mean integrated benefit for the subsample of twenty-four plans that did not comply with the proposed limits was \$2,533 lower than the mean integrated benefit for the entire sample of seventy-five integrated plans. Thus, on average the integrated plans that failed to comply with the proposal paid less benefits than those that did comply.

The significance of the difference between the means of the subsample of integrated plans and the sample of equivalent-modified-integrated plans was determined using a t-test. The same test statistic for the comparison of two related samples as was employed in the analysis for research question 2.B is used here (see p. 118). The test statistic was equal to 13.14. The probability of a t-value greater than this is .0001. Thus, the mean equivalent-modified-integrated benefit is significantly greater than the mean integrated benefit for these same plans at a significance level of .0001. Research question five further analyzes the differences among these two samples according to industry and characteristics of workers currently covered by pension plans.

Research Question 5

Research question 5.A determines whether there are significant differences across industry groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits. The research question is stated as follows: Are there significant differences across industry groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

An analysis of variance was done to determine if the discrepancies in the mean differences across industry groups shown in Table 5.13 are significantly different. The value of the F-test statistic was 52.57 (see p. 119 for a description of the F-test). The probability of getting a value greater than this is .0001. Therefore, there are significant differences across industry groups in the equivalent-modified-integrated pension benefits and the integrated pension benefits.

As discussed in research question three, the next step in the analysis is to determine between which industry groups the significant differences occur. The same procedure as employed in research question three, Duncan's multiple range test,¹² was used for these comparisons. The results appear in Table. 5.14.

The mean annual integrated benefits for the subsample of twenty-four plans shown in Table 5.13 were lower than the

TABLE 5.13

A COMPARISON ACROSS INDUSTRY GROUPS OF INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION PLAN BENEFITS

Industry	Mean Annual Benefit		Mean Difference
	Integrated Plans	Equivalent-Modified- Integrated Plans	
Mining	\$10,676	\$12,410	\$1,734
Construction	8,400	10,338	1,938
Manufacturing	7,546	8,161	615
Transportation & Communication	24,600	33,199	8,599
Wholesale Trade	11,217	11,894	677
Retail Trade	7,177	8,271	1,094
Finance, Insurance, & Real Estate	3,773	4,463	690
Services	8,529	9,989	1,460

TABLE 5.14

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION
BENEFITS ACROSS INDUSTRY GROUPS

Industry	Mean Difference	Duncan Group ^a
Transportation & Communication	\$8,599	A
Construction	1,938	B
Mining	1,734	B
Services	1,460	B C
Retail Trade	1,094	B C
Finance, Insurance, & Real Estate	690	C
Wholesale Trade	677	C
Manufacturing	615	C

^a Means with the same letter are not significantly different at a significance level of 5 percent.

mean annual integrated benefits for the entire sample of seventy-five plans, shown in Table 5.5, p. 120, for every industry except the transportation and communication industry. Also, the mean annual integrated and equivalent-modified-integrated benefits and the difference shown in Table 5.13 for the transportation and communication industry are significantly greater than the means for the other seven industries. The actual plans that were classified in this industry were examined to determine the cause of this result.

One of the integrated plans in this industry that did not comply with the proposed limits had a higher average benefit than any of the other seventy-four integrated plans. The average benefit per employee was \$34,356. The next highest average benefit was \$23,926. This plan was integrated according to the excess method and paid no benefits below the integration level, which corresponded to the Social Security taxable wage base each year. To comply with the modified limits the plan had to be altered so that it paid approximately 55 percent of the benefit percentage applied to wages above the integration level for all wages below the integration level. Hence, the large increase in benefits occurs as a result of the conversion to an equivalent-modified-integrated plan.

The average increase in benefits per employee due to equivalent-modified-integrated pension plans rather than integrated pension plans was not significantly different

among the construction, mining, services, and retail trade industries. This increase also was not significantly different among the services, retail trade, finance, wholesale trade, and manufacturing industries. However, the increase was significantly greater in the construction and mining industries than in the finance, wholesale trade, and manufacturing industries.

For research question 5.B, 5.C, and 5.D, the analysis performed on the differences across industry groups between integrated and equivalent-modified-integrated pension benefits was repeated for the differences across salary, age, and employment tenure groups.

Research question 5.B analyzes the following question: Are there significant differences across salary groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits? Tables 5.15 and 5.16 summarize the results. The analysis of variance across salary groups yielded an F-statistic of 2.84. The mean differences across the three salary groups, then, are significantly different at a 5 percent significance level. The greatest absolute difference in average benefits as a result of the modified-integrated plans occurs in the high salary group, followed by the median and low groups. The relative differences follow an opposite ranking. The largest relative difference occurs in the low salary group, followed by the median and high groups. Thus, if the proposed integration limits were

TABLE 5.15

A COMPARISON ACROSS SALARY GROUPS OF INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION PLAN BENEFITS

Salary	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent-Modified- Integrated Plans		
Low	\$ 2,837	\$ 4,153	\$1,316	.46
Median	6,241	8,059	1,818	.29
High	20,776	22,848	2,072	.10

TABLE 5.16

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION
BENEFITS ACROSS SALARY GROUPS

Salary	Mean Difference	Duncan Group ^a
High	\$2,072	A
Median	1,818	A B
Low	1,316	B

^aMeans with the same letter are not significantly different
at a significance level of 5 percent.

instituted approximately a third of the existing integrated pension plans would have to be altered. For these plans to maintain the level of benefits that is currently received by the highest salaried employees, the average benefit for the low-salaried employees and median-salaried employees would have to rise by approximately 46 percent and 29 percent, respectively. The rise in the average benefit for the high salary group would only be about 10 percent, and this rise would primarily occur in the benefits for the employees classified in the low end of this group.

Research question 5.C focuses on different age groups and is stated as follows: Are there significant differences across age groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits?

The analysis of variance across age groups yielded an F-statistic of 4.30. The mean differences across the four age groups, then, are significantly different at a significance level below .0052. See Tables 5.17 and 5.18. In examining the differences in benefits across age groups, the largest absolute difference in average equivalent-modified-integrated benefits and average integrated benefits is in the twenty-five-year-old group. The order of the other age group differences from largest to smallest is thirty-five, fifty, and sixty. The twenty-five and thirty-five-year-olds have a significantly greater average benefit difference than the sixty-year-olds.

TABLE 5.17

A COMPARISON ACROSS AGE GROUPS OF INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION PLAN BENEFITS

Age ^a	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent-Modified- Integrated Plans		
Sixty	\$ 6,891	\$ 7,969	\$1,078	.16
Fifty	10,605 ^b	12,113 ^c	1,508 ^d	.14
Thirty-five	13,660 ^b	15,748 ^c	2,088 ^d	.15
Twenty-five	8,650 ^b	10,916 ^c	2,266 ^d	.26

^a1984, 1994, 2009, and 2019 are the years-of-retirement for the sixty, fifty, thirty-five, and twenty-five age groups, respectively. The age groups correspond to years-of-age in 1979.

^bThe mean annual integrated benefits for retirement years 1994, 2009, and 2019 were \$17,265, \$40,051, and \$37,550, respectively, before being deflated to 1984 dollar levels.

^cThe mean annual equivalent-modified-integrated benefits for retirement years 1994, 2009, and 2019 were \$19,720, \$46,172, and \$47,387, respectively, before being deflated to 1984 dollar levels.

^dThe mean differences for retirement years 1994, 2009, and 2019 were \$2,455, \$6,121, and \$9,837, respectively, before being deflated to 1984 dollar levels.

TABLE 5.18

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION
BENEFITS ACROSS AGE GROUPS

Age	Mean Difference	Duncan Group ^a
Twenty-five	\$2,266	A
Thirty-five	2,088	A
Fifty	1,508	A B
Sixty	1,078	B

^aMeans with the same letter are not significantly different at a significance level of 5 percent.

The relative differences range from 14 percent to 16 percent for all age groups except the twenty-five year olds. Their relative difference is 26 percent. Again, this may be due to the increased taxable wage bases and Social Security benefit levels that are attained by the year 2019. When the integrated plan formulas are converted to equivalent-modified-integrated plan formulas the minimum benefit that must be paid below the original integration and offset levels is increased. By 2019, a greater proportion of employee wages may be falling below these levels. Hence, the conversion for this age group raises average benefits by a greater relative amount.

Research question 5.D focuses on employment tenure groups and is stated as follows: Are there significant differences across employment tenure groups in the reduction in pension benefits due to the existing integration limits rather than the modified integration limits? The results are presented in Tables 5.19 and 5.20.

The mean absolute differences in equivalent-modified-integrated benefits and integrated benefits across employment tenure groups are significantly different below a significance level of .0001. The mean absolute differences are significantly higher in the forty-one and twenty-five-year groups than in the nine-year group. This is expected since many of the integrated benefit formulas are expressed as a percentage of wages times years-of-service. The conversion of these formulas to equivalent-modified-integrated formulas

TABLE 5.19

A COMPARISON ACROSS EMPLOYMENT TENURE GROUPS OF INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION PLAN BENEFITS

Years-of- Service at Retirement	Mean Annual Benefit		Mean Difference	Relative Difference
	Integrated Plans	Equivalent-Modified- Integrated Plans		
Nine	\$ 4,238	\$ 5,080	\$ 842	.20
Twenty-five	10,696	12,709	2,013	.19
Forty-one	14,920	17,270	2,350	.16

TABLE 5.20

A COMPARISON OF THE MEAN DIFFERENCES IN INTEGRATED
AND EQUIVALENT-MODIFIED-INTEGRATED PENSION
BENEFITS ACROSS EMPLOYMENT TENURE GROUPS

Years-of-Service at Retirement	Mean Difference	Duncan Group ^a
Forty-one	\$2,350	A
Twenty-five	2,013	A
Nine	842	B

^a Means with the same letter are not significantly different
at a significance level of 5 percent.

raises the benefit percentage applied to wages below the integration level or reduces the offset percentage. Many of these altered percentages, however, are multiplied by a years-of-service factor before the modified benefit is determined. Thus, there is a greater increase in modified benefits the greater the years-of-service factor.

The relative differences across the three employment tenure groups do not vary as much as the absolute differences. The largest is 20 percent and occurs in the nine-year group. The relative differences for the twenty-five and forty-one-year groups are 19 percent and 16 percent, respectively. The small variation among the three relative differences may be due to all three salary levels (low, median, and high) being represented equally in each group.

Research Question 6

Research question six compares the current integrated private pension tax subsidy to a third benchmark. This benchmark is a subsidy designed to provide enough private pension retirement income so a retiree's total retirement income (composed of Social Security, private pensions, and private assets) is sufficient to enable him or her to maintain a preretirement standard of living. The research question is stated as follows: Are the expected pension benefits provided by the current integrated private pension tax subsidy, when combined with Social Security and private asset income, adequate to maintain a current retiree's

preretirement standard of living? The results appear in Table 5.21.

The employee profiles with a retirement date of 1984 were used in this comparison. This was done because the income replacement percentages necessary to maintain preretirement living standards and the expected amount of private asset income for various income levels may not be stable over long time periods. The estimates of these parameters that were used in this analysis were taken from a 1982 economic study.¹³

The 1984 employee profiles were composed of nine combinations of average salary and years-of-service at retirement. The average integrated pension benefits for these nine profiles were developed by the simulation model using all seventy-five integrated pension plans. The years-of-service at retirement represents the employment tenure with the firm providing the pension benefit. Hence, the average integrated benefits vary according to years-of-service. Note, no employee was included in the analysis with an employment tenure of less than ten years if he or she indicated they were also included in a plan of a previous employer. Those employees represented by the profiles are, then, probably only eligible to receive benefits from one employer.

The primary Social Security benefits for each employee profile were obtained from a benefit computation computer program developed by the Office of the Actuary of the Social

TABLE 5.21

A COMPARISON OF THE INTEGRATED PENSION TAX SUBSIDY TO
ONE NECESSARY TO MAINTAIN PRERETIREMENT LIVING STANDARDS

Average Prereti- ment Income	Years-of- Service at Retirement	Average Integrated Pension Benefit	Primary Social Security Benefit	Percentage Of Income Replaced by (3)+(4)	Private Asset Income	Percentage of Income Replaced by (3)+(4)+(6)	Percentage to Maintain Living Standard
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
\$11,699	9	\$ 1,055	\$ 6,226	.62	\$ 281	.65	.75
11,699	25	2,609	6,226	.75	281	.78	.75
11,699	41	3,969	6,226	.87	281	.89	.75
21,878	9	2,018	9,589	.53	1,400	.59	.68
21,878	25	5,180	9,589	.67	1,400	.74	.68
21,878	41	7,856	9,589	.80	1,400	.86	.68
61,260	9	7,539	11,239	.31	4,962	.39	.58
61,260	25	19,407	11,239	.50	4,962	.58	.58
61,260	41	27,612	11,239	.63	4,962	.71	.58

Security Administration.¹⁴ These benefits do not vary according to the employment tenure with the firm providing the pension benefit. They are dependent on total years-of-service with all employers from age twenty-two to sixty-five. This is assumed to remain constant among the profiles. The three levels of private asset income expected after retirement were 2.4, 6.4, and 8.1 percent of average pre-retirement income.

The percentage of income replaced by the three income sources ranges from 39 percent to 89 percent. The employee profiles that do not receive enough retirement income to maintain preretirement living standards are all characterized by an employment tenure of nine years. The low-income group requires 75 percent of preretirement income and only receives 65 percent. Similarly, the median-income group requires 68 percent of preretirement income and only receives 59 percent, while the high-income group requires 58 percent of preretirement income and only receives 39 percent. Hence, the current integrated private pension tax subsidy seems adequate for the maintenance of preretirement living standards for all employee groups except those with few years-of-service.

The preceding analysis was repeated using nonintegrated pension benefits. Thus, the degree current retirees receiving nonintegrated pension benefits are able to maintain their preretirement living standard was analyzed. The results appear in Table 5.22. Here, again the employee

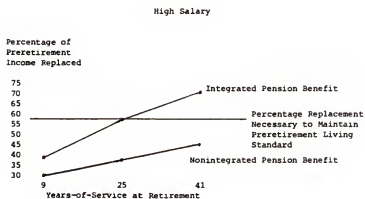
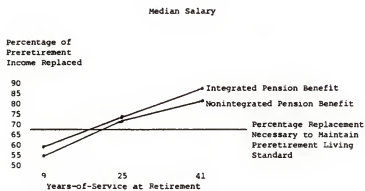
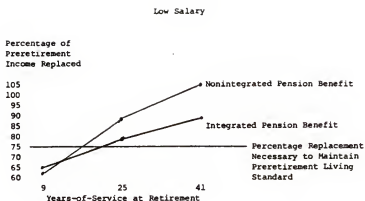
TABLE 5.22

A COMPARISON OF THE NONINTEGRATED PENSION TAX SUBSIDY TO
ONE NECESSARY TO MAINTAIN PRERETIREMENT LIVING STANDARDS

Average Prereti- ment Income	Years-of- Service at Retirement	Average Noninte- grated Pension Benefit	Primary Social Security Benefit	Percentage of Income Replaced by (3)+(4)	Private Asset Income	Percentage of Income Replaced by (3)+(4)+(6)	Percentage to Maintain Living Standard
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
\$11,699	9	\$ 874	\$ 6,226	.61	\$ 281	.63	.75
11,699	25	3,963	6,226	.87	281	.89	.75
11,699	41	5,741	6,226	1.03	281	1.05	.75
21,878	9	1,122	9,589	.49	1,400	.55	.68
21,878	25	4,764	9,589	.66	1,400	.72	.68
21,878	41	6,852	9,589	.75	1,400	.82	.68
61,260	9	2,083	11,239	.22	4,962	.30	.58
61,260	25	7,910	11,239	.31	4,962	.39	.58
61,260	41	11,253	11,239	.37	4,962	.45	.58

profiles characterized by an employment tenure of nine years at all three salary levels do not receive enough retirement income to maintain preretirement living standards. This is partially due to the fact that approximately 35 percent of the nonintegrated plans do not pay any benefits to employees retiring with less than ten years-of-service.¹⁵

The employee profiles characterized by employment tenures of twenty-five years and forty-one years and a high salary level also do not receive adequate retirement income to maintain preretirement living standards. This is due to the focus of most nonintegrated plans on the low and median salary groups. In fact the low salary group with forty-one years-of-service replaced more than 100 percent of their preretirement income with retirement income. A graphic comparison of the maintenance of preretirement living standards by current retirees receiving integrated and nonintegrated pension benefits is presented in Figure 5.2.



A COMPARISON OF INTEGRATED AND
NONINTEGRATED PENSION BENEFITS IN
MAINTAINING PRERETIREMENT LIVING STANDARDS

FIGURE 5.2

Notes

¹Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).

²George W. Snedecor and William G. Cochran, Statistical Methods (Ames, Iowa: Iowa State University Press, 1980), pp. 96-98.

³Ibid., p. 98.

⁴Ibid., p. 97.

⁵Ibid.

⁶Ibid., p. 85.

⁷Ibid., p. 221.

⁸Victor Chew, Comparisons Among Treatment Means in an Analysis of Variance (Washington, D.C.: U.S. Department of Agriculture, 1977), p. iii.

⁹Ibid., pp. 20-22.

¹⁰Ibid., p. 21.

¹¹David B. Duncan, "Multiple Range and Multiple F-Tests," Biometrics, no. 11 (1955), pp. 1-42.

¹²See pages 118-119 for an explanation of Duncan's multiple range test.

¹³Alicia Munnell, The Economics of Private Pensions (Washington, D.C.: Brookings Institution, 1982) pp. 22-25.

¹⁴S. McKay, Computing a Social Security Benefit After the 1977 Amendments (Washington, D.C.: Social Security Administration, 1980).

¹⁵If the low employment tenure level had been eleven years, the income replacement percentage for this group would have risen.

CHAPTER VI
SUMMARY AND CONCLUSIONS

Background and Purpose

Providing retirement income for the current and future elderly population has become a national concern. This has been prompted by a combination of factors. One is changing demographics. Expected life spans are increasing, while birthrates are decreasing. Thus, the ratio of the working population to the retirement population may be declining substantially. Second, the recent instability of the Social Security system has caused the nation's confidence in the system's continued viability to be seriously undermined. As a result, an examination of the benefit adequacy of the private pension system is in order.

There are two types of private pension plans--nonqualified and qualified. The primary difference is the tax treatment afforded each. Employer contributions to a nonqualified plan are includible in an employee's taxable income in the year he has attained a nonforfeitable right to ultimately receive the contribution.¹ The employer's deduction for the contribution is allowed for the year the employee includes the contribution in income.² Finally, the income earned by a nonqualified plan is subject to tax each year.³ In contrast, employer contributions to a qualified

plan and the interest they accrue go untaxed until ultimately received by the employee.⁴ The employer, however, receives a deduction for the contributions in the year they are paid.⁵ This postponement of taxes allowed for participants of qualified plans results in what is equivalent to an interest-free, long-term loan from the government.

The tax revenue loss as a result of the qualified pension tax subsidy has been estimated at \$34 billion for fiscal year 1984 and \$65 billion by 1988.⁶ In fact, of all the tax expenditures resulting from various income exclusion, tax credit, deduction, or preferential tax rate provisions, the one pertaining to the net exclusion of qualified plan contributions and earnings ranks first. It represents approximately 10 percent of all tax expenditures for fiscal year 1984 and 13 percent for fiscal year 1988.⁷

To be accorded this favorable qualified plan tax treatment, a plan must not discriminate in favor of the "prohibited group" in terms of both the breadth of employee coverage and the allocation of contributions and benefits among the covered employees.⁸ The "prohibited group" is comprised of employees who are stockholders, officers, or highly compensated.⁹ Basically, the plan will not be considered discriminatory if it covers at least 56 percent of the company's employees and the employer contributions, or the benefits provided by the plan, are proportional to wage income.¹⁰ The one exception to the proportional

contribution or benefit qualification requirement is a concept known as integration.

In the case of a defined contribution plan, integration allows an employer to take into account the employer's share of Social Security payroll taxes in determining whether the plan is discriminatory or not and hence qualified.¹¹ In the case of a defined benefit plan, the employer is allowed to take into account the Social Security benefit deemed provided by these payroll taxes. Thus, if the private pension benefit provided by the employer, when combined with the Social Security benefit deemed provided by him, is proportional to wage income, the plan can still qualify for favorable tax treatment.

Allowing an employer to elect to integrate his qualified pension plan with the Social Security system may have skewed the incidence of the private pension tax subsidy. The subsidy may be benefiting the low-paid employees and median-paid employees less and less as Social Security payroll taxes and benefits increase. The purpose of this study was to determine the effectiveness of the integrated private pension tax subsidy in providing adequate retirement income to all classes of workers.

The effectiveness of the integrated pension subsidy was determined by comparing it to three benchmarks. The first benchmark is a tax subsidy that is strictly proportional to wage income. The second benchmark is a modified integrated tax subsidy proposed by President Carter in 1978. The final

benchmark is a subsidy designed to provide enough private pension retirement income so a retiree's total retirement income (composed of Social Security, private assets, and private pensions) is sufficient to enable him or her to maintain a preretirement standard of living.

Research Methodology and Results

The basic research methodology employed in this study is an empirically-based microsimulation model. Integrated and nonintegrated qualified pension plan benefits are derived from actual plan structures contained in the 1981 Level of Benefits Study¹² done by the Bureau of Labor Statistics and actual employee characteristics developed from Patterns of Worker Coverage by Private Pension Plans,¹³ a pension coverage supplement to the 1979 Current Population Survey. The actual integrated plans are then converted to equivalent-nonintegrated plans which provide benefits proportional to salary for all wage levels. The profiles of employee characteristics mentioned above are used then to calculate equivalent-nonintegrated benefits.

The actual integrated plans are examined also to determine which would fail to meet the lower integration limits proposed in 1978. The plans that would fail to meet these limits are modified so that they would qualify. The expected benefits from the modified-integrated plans are calculated then based on the employee profiles.

Finally, a subset of employees retiring in 1984 are focused on to determine if their expected retirement income is sufficient to maintain preretirement living standards. The estimated amount of income they could expect to receive from integrated private pension benefits, Social Security, and private assets is determined. This amount is then compared to the amount they would need to maintain their preretirement living standard.

The results of the study are organized and summarized by research question.

Research Question 1

The purpose of research question one was to ascertain whether there are any significant identifying characteristics of integrated pension plans. The characteristics examined were unionization of participants, geographic region, and industry classification. The complete sample of 963 pension plans contained in the Level of Benefits Study¹⁴ was used for this analysis. There were 522 integrated pension plans and 441 nonintegrated pension plans.

There was a significant difference in the percentage of integrated pension plans with unionized participants and the percentage of nonintegrated plans with unionized participants. Approximately, 6 percent of the integrated pension plans had unionized participants, while approximately 59 percent of the nonintegrated pension plans had unionized participants. The significant differences in geographic

region among integrated and nonintegrated plans were found in the South and North Central regions. The proportion of integrated plans found in the South was significantly greater than the proportion of nonintegrated plans found in this region. The proportion of integrated plans found in the North Central was significantly less than the proportion of nonintegrated plans found here. This result is consistent with the expectation of unions being less prevalent in the South and more prevalent in the North Central region.

There was also a significant difference in the proportion of integrated and nonintegrated pension plans classified in two of the eight industry groups. There were significantly less integrated plans in the manufacturing industry, and significantly more integrated plans in the finance, insurance, and real estate industry. Again the results seem consistent. One would expect that unions would be more prevalent in the manufacturing industry and less prevalent in the finance, insurance, and real estate industry. Also the manufacturing industry would be expected to be concentrated more heavily in the North Central region than in the South.

Research Questions 2 and 3

Research questions two and three compared the current integrated subsidy to one that is proportional to wage income at all levels. First, actual integrated pension plan benefits are compared to actual nonintegrated pension plan

benefits. All of the nonintegrated plans were qualified. Hence, the benefits must be proportional to salary to meet the nondiscrimination requirement.

The mean integrated benefit was \$12,484, while the mean nonintegrated benefit was significantly less, \$5,951. The means of the various industry, salary, age, and employment tenure groups were compared also among the integrated and nonintegrated samples. Using the entire sample, the mean annual integrated benefit was greater than the mean annual nonintegrated benefit for every group characteristic examined. However, when focusing only on the 1984 retirees the mean annual nonintegrated benefit is greater than the mean annual integrated benefit for the low salary group.

Among the industry groups the greatest relative difference between the annual benefits expected from the two types of plans was in the transportation and communication industry. The mean annual nonintegrated benefit was only 26 percent of the mean annual integrated benefit. The smallest relative difference among the industry groups was in the retail trade industry where the mean nonintegrated benefit was 80 percent of the mean integrated benefit.

The greatest relative difference between the mean integrated benefits and nonintegrated benefits among the three employee characteristic groups examined was in the high salary group and the low employment tenure group. The mean nonintegrated benefit was 91, 60, and 35 percent of the mean integrated benefit for the low, median, and high salary

groups, respectively. Similarly, the mean nonintegrated benefit was 33, 50, and 50 percent of the mean integrated benefit for the low, median, and high employment tenure groups, respectively. The large relative difference in the high salary group can be explained by the structure of the integration laws. They purposely allow higher salaried employees to receive a greater proportion of their preretirement salary in private pension benefits than the lower salaried employees. The large relative difference in the low employment tenure group is explained by a greater proportion of nonintegrated plans (than integrated plans) having benefit formulas based solely on employment tenure and which pay no benefits to employees having less than ten years-of-service at retirement.

The second measure used to compare the current integrated tax subsidy to a tax subsidy that is proportional to wage income is equivalent-nonintegrated pension benefits. The equivalent-nonintegrated plan formulas were derived from the actual integrated plan formulas by selecting the highest benefit to compensation ratio per year-of-service and applying that ratio uniformly to the salary of all participants. If proportional benefits were the benchmark, this analysis reveals how much the benefits of the low-salaried and median-salaried workers would have to increase in order to maintain the current level of benefits received by the high-salaried employees. This analysis cannot predict what would actually occur if integration was disallowed.

Obviously, employers may choose to amend their pension plans, reducing benefits at all salary levels, in order to achieve proportionality. The analysis does reveal, however, how far the current integrated tax subsidy has deviated from proportionality.

The mean equivalent-nonintegrated benefit was \$14,556. This amount was significantly greater than the mean integrated benefit of \$12,484. The differences in the mean integrated and equivalent-nonintegrated benefits were also significantly different across the three salary groups. To achieve proportionality, the mean integrated benefit for the low, median, and high salary groups must be increased by 41, 29, and 7 percent, respectively. The 7 percent increase in the high salary group would occur at the low end of the salaries in this group. Thus, it seems that integration has allowed the current tax subsidy to deviate substantially from proportionality.

Research Questions 4 and 5

Research questions four and five compare the current integrated subsidy to the modified-integrated subsidy proposed in 1978. The first step in this comparison determined that 32 percent of the current integrated benefit plan structures would fail to meet the modified integration limits. The mean benefit provided by the subsample of integrated plans which failed to meet the proposal was \$9,951. Once the plans were modified, the mean equivalent-

modified-integrated benefit was significantly greater, \$11,686.

The mean integrated and equivalent-modified-integrated benefits were also significantly different across industry and salary groups. The largest increase in the mean annual benefit as a result of the modified integration limits occurred in the transportation and communication industry. The mean annual benefit per employee in this industry increased by \$8,599. This large increase can be explained by the structure of the integrated plans currently found in this industry. These plans tended to be integrated according to the excess integration method. They paid a very large benefit based on wages above the integration level and no benefit for wages below the integration level. To conform to the 1978 proposal these plans had to be modified so that they applied approximately 55 percent of the benefit percentage applied to wages above the integration level to those wages below the integration level. Hence, the large increase in the average benefit.

Examining the difference in the mean integrated and modified-integrated benefits across salary groups also reveals significant differences. To conform to the 1978 proposal, the mean integrated benefits for the low, median, and high salary groups increased by 46, 29, and 10 percent, respectively. Thus, the proposal would have substantially increased the incidence of the pension tax subsidy in the low and median salary groups.

Research Question 6

Research question six compares the current integrated subsidy to one that allows a retiree to maintain a preretirement standard of living. Due to lower taxes, lower expenditures for household services, and reduced work expenses, retirees require only 50 to 80 percent of preretirement earnings to maintain preretirement living standards.¹⁵ Research question six focuses on nine employee profiles with a 1984 retirement date. The nine profiles are all possible combinations of three salary levels--low, median, and high--and three years-of-service at retirement levels--nine, twenty-five, and forty-one.

The percentage of preretirement income replaced by the total of integrated private pension benefits, Social Security, and private asset income ranged from 39 percent to 89 percent. The employee profiles that did not receive enough retirement income to maintain preretirement living standards were all characterized by an employment tenure of nine years. The low-income group required 75 percent of preretirement income and only received 65 percent. Similarly, the median-income group required 68 percent of preretirement income and only received 59 percent, while the high-income group required 58 percent of preretirement income and only received 39 percent. Hence, the current integrated private pension tax subsidy seems adequate for the maintenance of preretirement living standards for all employee groups except those with few years-of-service.

The current nonintegrated subsidy was also compared to one that allows a retiree to maintain a preretirement standard of living. Here, the current subsidy was adequate for the maintenance of preretirement living standards for employee groups with a low or median salary level and twenty-five or forty-one years-of-service.

Limitations

Two limitations of this study are that pension plan data from small firms and the effect of the top heavy rules enacted by the Tax Equity and Fiscal Responsibility Act of 1982¹⁶ are not included. The sample of pension plans obtained from the Level of Benefits Study¹⁷ was limited to plans from firms employing at least fifty, one hundred or two hundred and fifty workers, depending on the industry. The plan benefit structure data also did not include enough information to determine if the plan was top heavy and hence may be required to provide supplemental benefits.

A benefit plan is defined to be top heavy if the present value of the accumulated accrued benefits for key employees is greater than 60 percent of the present value of the accumulated accrued benefits for all employees under the plan.¹⁸ Similarly, a contribution plan is top heavy if the sum of the account balances of participants who are key employees for the plan year exceeds 60 percent of the sum of the account balances of all employees under the plan.¹⁹ A key employee is a plan participant who at any time during

the last four years has been (1) an officer of the firm, (2) one of the ten employees owning the largest interests in the firm, (3) a 5 percent owner of the firm, or (4) a 1 percent owner with an annual salary greater than \$150,000.²⁰ A top heavy plan, in order to remain qualified, must provide a minimum nonintegrated benefit or contribution to all non-key employees participating in the plan. The benefit equals 2 percent of average annual compensation times years of service, while the contribution is 3 percent of each participant's actual compensation.²¹

The effect of these limitations may be complimentary. The top heavy rules apply primarily to small firm plans weighted heavily in favor of key employees. They are intended to alleviate some of the discrimination, partly due to integration, found in these firm's plans.²² To the extent that the top heavy rules do not alleviate the discrimination found in small pension plans, the results of this study will be understated. Congress intended for medium and large firms, however, to be relatively unaffected by the top heavy rules.²³ Thus, examining the integrated pension benefits provided only by medium and large size firms may be very useful to Congress and not a substantial limitation.

A final limitation of this study concerns the 1983 Social Security Amendments Act.²⁴ Due to its recent passage (April, 1983) the full effect of this law's change has not been factored into this simulation. The Act seeks to raise

the normal retirement age to age seventy, institute automatic Social Security benefit escalators for changes in the Consumer Price Index, and tax Social Security benefits received when total income exceeds a base amount.²⁵ Thus, this Act may affect the size of the future retirement population and the amount of primary Social Security benefit they will receive. This, in turn, may affect the amount of any integrated pension benefit that can be expected. Thus, the replacement percentages of preretirement income necessary to maintain living standards and the expected replacement percentages for retirees receiving pension benefits presented in Tables 5.21 and 5.22 may not be completely stable over time.

Conclusion and Future Research

The results of this study provide information useful in addressing the following policy questions:

1. Do subsidized integrated and nonintegrated private pension plans provide less than adequate or excessive retirement income?
2. Should the pension tax subsidy be limited to nonintegrated plans or should it apply to both nonintegrated and integrated plans?

If maintenance of preretirement living standards is taken as the measure of adequacy, average integrated pension benefits when combined with Social Security benefits and private asset income yield more adequate replacement percentages than nonintegrated pension benefits. The replacement percentages using average integrated pension benefits

fall below those needed to maintain living standards for only three of the nine employee profiles. The replacement percentages using average nonintegrated pension benefits are below the benchmark for five of the nine employee profiles.

Both the integrated and nonintegrated pension subsidies are inadequate for employee profiles with low years-of-service levels. However, the nonintegrated pension subsidy is also excessive for employee profiles with low salary and high years-of-service levels. The integration proponents' argument concerning the possibility of greater than 100 percent replacement of preretirement income with subsidized nonintegrated pension benefits and subsidized Social Security benefits seems to be justified for these employee profiles.

The integrated pension subsidy may be excessive for employee profiles with high salary and average to high years-of-service levels. This result may be magnified by the increased availability of other subsidized forms of saving to higher-income employees. These other forms of saving may stem from the increased availability of cafeteria compensation plans that allow executives to postpone the receipt of some of their salary or receive it in other tax-free forms. Also the increase in the maximum contribution to Individual Retirement Accounts may allow higher-income groups access to another form of subsidized saving that is less utilized by the lower-income groups. To the extent that these other forms of saving are utilized more by

future retirees than they have been in the past, the percentage of preretirement income replaced in retirement with private asset income will increase. This may in turn necessitate lower amounts of subsidized pension benefits for these employees to maintain their preretirement standard of living.

Given the results of this study, I would recommend that Congress seek to provide some relief to retirees with low years-of-service levels. Due to the increased mobility of labor, more and more retirees may fall into this category. Congress should either focus on requiring portability of benefits or stricter vesting rules. It may be necessary to require immediate vesting for all subsidized pension plans.

I would further recommend that Congress allow integrated pension plans to remain subsidized but amend the integration laws so as to further limit the amount of the subsidy received by high-salaried employees. Future research in the integration area could explore at what level the lower integration limits should be set. This research could begin by exploring the equivalence of the current integration limits to the portion of the employee's Social Security benefit actually purchased by employer contributions. A study of this type would have to actuarially determine the magnitude of the pension benefits that could be purchased with various levels of employer Social Security contributions. There is recent evidence that the Social Security benefit received by many retirees is not

actuarially equivalent to the total Social Security contributions made previously by the retiree and his employers.²⁶ The integration limits should not allow an employer to reduce his private pension plan benefits for any Social Security benefits that cannot be directly attributable to his contributions. Thus, the integration limits should at least be lowered to a level that reflects only the Social Security benefit that is directly purchased by the employer. Once this level is determined, future research would then have to reassess whether the reformed subsidy was still excessive for high income employees.

Notes

- ¹I.R.C. Section 402(b).
- ²I.R.C. Section 404(a)(5).
- ³I.R.C. Section 641(a).
- ⁴I.R.C. Sections 402(a) and 501(a).
- ⁵I.R.C. Section 401(a)(1)
- ⁶U.S. Congress, Joint Committee on Taxation, Estimates of Federal Tax Expenditures for Fiscal Years 1983-1988, Joint Committee Print, Study Paper 16 (Washington, D.C.: U.S. Government Printing Office, 1983).
- ⁷Ibid.
- ⁸I.R.C. Sections 401(a)(4) and 410(b)(1)(B).
- ⁹Ibid.
- ¹⁰I.R.C. Sections 410(b)(1)(A) and 401(a)(4).
- ¹¹I.R.C. Section 401(a)(5).
- ¹²Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).
- ¹³Daniel J. Beller, Patterns of Worker Coverage by Private Pension Plans (Washington, D.C.: U.S. Department of Labor, 1980).
- ¹⁴Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).
- ¹⁵Alicia Munnell, The Economics of Private Pensions (Washington, D.C.: Brookings Institution, 1982) p. 23.
- ¹⁶Tax Equity and Fiscal Responsibility Act of 1982, Public Law No. 97-248, August 19, 1982.
- ¹⁷Employee Benefits in Medium and Large Firms, 1981, U.S. Department of Labor Bulletin 2140 (August, 1982).
- ¹⁸I.R.C. Section 416(g)(1)(A)(i).
- ¹⁹I.R.C. Section 416(g)(1)(A)(ii).
- ²⁰I.R.C. Section 416(i).

²¹I.R.C. Section 416(c).

²²Ray Schmitt, Pension Tax Equity, Congressional Research Service (Washington, D.C.: U.S. Government Printing Office, 1982) p. 1.

²³Ibid.

²⁴Social Security Amendments of 1983, Public Law No. 98-21, April 20, 1983.

²⁵Ibid.

²⁶Edmund Outslay and James E. Wheeler, "Separating the Annuity and Income Transfer Elements of Social Security," The Accounting Review (October, 1982) pp. 716-733.

APPENDIX I

HISTORICAL AND PROJECTED
FICA TAXABLE WAGE BASES

<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>
1937-1950	\$ 3,000	1993	\$ 67,800
1951-1954	3,600	1994	71,400
1955-1958	4,200	1995	75,300
1959-1965	4,800	1996	79,500
1966-1967	6,600	1997	84,000
1968-1971	7,800	1998	88,500
1972	9,000	1999	93,300
1973	10,800	2000	98,400
1974	13,200	2001	103,800
1975	14,100	2002	109,500
1976	15,300	2003	115,500
1977	16,500	2004	121,800
1978	17,700	2005	128,400
1979	22,900	2006	135,600
1980	25,900	2007	143,100
1981	29,700	2008	150,900
1982	32,400	2009	159,300
1983	35,700	2010	168,000
1984	37,500	2011	177,300
1985	40,500	2012	187,200
1986	43,800	2013	197,400
1987	46,800	2014	208,200
1988	50,100	2015	219,600
1989	53,400	2016	231,600
1990	57,000	2017	244,200
1991	60,600	2018	257,700
1992	64,200	2019	271,800

Taxable wage base refers to the maximum amount of earnings which may be considered wages under Code Section 3121(a)(1).

APPENDIX II COVERED COMPENSATION

<u>Calendar Year of 65th Birthday</u>	<u>Table 1</u>	<u>Table 2</u>
1982	\$10,800	\$11,004
1983	12,000	11,892
1984	12,600	12,708
1985	13,200	13,464
1986	14,400	14,172
1987	15,000	14,820
1988	15,600	15,420
1989	16,200	15,996
1990	16,800	16,524
1991	16,800	17,016
1992	17,400	17,484
1993	18,000	17,916
1994	18,600	18,336
1995	19,200	19,128
1996	19,800	19,908
1997	21,000	20,700
1998	21,600	21,492
1999	22,200	22,272
2000	22,800	23,064
2001	24,000	23,856
2002	24,600	24,588
2003	25,200	25,332
2004	25,800	26,028
2005	27,000	26,736
2006	27,600	27,432
2007	28,200	28,140
2008	28,800	28,812
2009	29,400	29,424
2010	30,000	29,976
2011	30,600	30,492
2012	31,200	30,984
2013	31,200	31,440
2014	31,800	31,860
2015	32,400	32,136
2016	32,400	32,316
2017	32,400	32,400
and later		

Source--IRS Notice 82-2, 1982-1 C.B. 353. Table 2 represents exact amounts. Table 1 involves rounding to the nearest whole multiple of \$600. The IRS allows a plan to specify the use of either amount.

APPENDIX III

SUMMARY OF ADJUSTMENTS TO INTEGRATION LIMITATIONS

- A. If preretirement death benefits are offered in the form of a:
- (1) Lump sum benefit, multiply the limitation by:
 - (a) $8/9$ (or .89) if benefits do not exceed the greater of the reserve or total prior contributions,
 - (b) $8/10$ (or .80) if benefits equal 100 times the anticipated monthly pension, or
 - (c) $7/9$ (or .78) if benefits are equal to the greater of (a) or (b) above; or
 - (2) Spouse's annuity, multiply the limitation by the fraction 7 divided by $(7 \text{ plus } 2k)$ where k equals the survivor's benefit in the form of a straight life annuity not exceeding 100 percent.
- B. If retirement benefits are in a form other than a straight life annuity, multiply the limitation by:
- (1) 97 percent if annuity is for 5 years certain and life thereafter,
 - (2) 90 percent if annuity is for 10 years certain and life thereafter,
 - (3) 80 percent if annuity is for 15 years certain and life thereafter,
 - (4) 70 percent if annuity is for 20 years certain and life thereafter,
 - (5) 90 percent if it is a life annuity with an installment refund,
 - (6) 85 percent if it is a life annuity with a cash refund,
 - (7) 80 percent if it is a life annuity with one-half continued to the surviving spouse.

- C. If normal retirement age is lower than 65, multiply the limitation by:
- (1) $1/15$ (or .067) for each of the first 5 years under age 65, and
 - (2) $1/30$ (or .033) for each of the next five years, or
 - (3) $1/12$ (or .083) for each of the first 5 years under a flat-benefit excess plan, or
 - (4) $1/24$ (or .042) for each of the next 5 years.
- D. Multiply limitation by 90% if it provides for disability benefits before age 65.
- E. If plan calls for employee contributions, increase limitation by:
- (1) $1/6$ (or .166) of the employee's contributions if benefits are based on actual compensation, or
 - (2) $1/8$ (or .125) of the employee's contributions if benefits are based on average compensation.

APPENDIX IV

SUBSAMPLE OF ACTUAL INTEGRATED PENSION FORMULAS

- (1) $A = (.014 * AAC3 * YSV) - (.014 * PIA * YSV33)$
 $B = 144 * CPI * YSV$
- (2) $A = (.0125 * SLTE6) + (.02 * SGT6)$
 $B = 96 * CPI * YSV$
 $C = (.0265 * SE17) - (.75 * PIA)$
- (3) $[(.0125 * AMIN1 (AAC5, 9000 * CPI)) + (.0158 * (AAC5 - 9000 * CPI))] * YSV40$
- (4) $[(.0035 * AMIN1 (AAC5, ILCA)) + (.016 * (AAC5 - ILCA))] * YSV$
- (5) $(.015 * AAC5 * YSV) - (.015 * PIA * YSV33)$
- (6) $[(.01 * AMIN1 (AAC5, ILCA)) + (.015 * (AAC5 - ILCA))] * YSV$
- (7) $A = (.015 * AAC5 * YSV) - (.0125 * PIA * YSV40)$
 $B = 72 * CPI * YSV$
- (8) $[(.0104 * AMIN1 (AAC7, 6600 * CPI)) + (.015 * (AAC7 - 6600 * CPI))] * YSV$
- (9) $A = (.016 * AAC3 * YSV) - (.015 * PIA * YSV33)$
 $B = 144 * CPI * YSV$
- (10) $A = (.0133 * AAC5 * YSV30) - (.025 * PIA * YSV30)$
 $B = 120 * CPI * YSV$
- (11) $A = (.0122 * AAC1 * YSV33) - (.015 * PIA * YSV33)$
 $B = (.01 * SLTEIL) + (.015 * SGTIL)$
- (12) $[(.004 * AMIN1 (AAC5, ILCA)) + (.016 * (AAC5 - ILCA))] * YSV25$
- (13) $A = (.015 * SLTE7) + (.02 * SGT7)$
 $B = 120 * CPI * YSV$
- (14) $[(.01 * AMIN1 (AAC5, 7800 * CPI)) + (.0175 * (AAC5 - 7800 * CPI))] * YSV$

- (15) $[.15 * \text{AMIN1}(\text{AAC5}, 12000 * \text{CPI})) + (.11 * (\text{AAC5} - 12000 * \text{CPI})) + [.0167 * \text{AMIN1}(\text{AAC5}, 12000 * \text{CPI}) * (\text{YSV15} - 1)] + [.01 * (\text{AAC5} - 12000 * \text{CPI}) * (\text{YSV15} - 1)] - [(.022 * \text{PIA}) + (.02 * \text{PIA} * (\text{YSV} - 1))]$
- (16) $A = (.0088 * \text{SLTE1}) + (.015 * \text{SGT1})$
 $B = 108 * \text{CPI} * \text{YSV}$
 $C = (.01 * \text{SLTE1}) + (.015 * \text{SGILIL}) + (.02 * \text{SGTIL})$
- (17) $A = (.016 * \text{AAC3} * \text{YSV}) - (.015 * \text{PIA} * \text{YSV33})$
 $B = 144 * \text{CPI} * \text{YSV}$
- (18) $(.0075 * \text{SLTE2}) + (.015 * \text{SGT2})$
- (19) $[(.005 * \text{AMIN1}(\text{AAC5}, \text{ILI})) + (.014 * (\text{AAC5} - \text{IL1}))] * \text{YSV35}$
- (20) $A = (.0167 * \text{AAC3} * \text{YSV}) - (.015 * \text{PIA} * \text{YSV33})$
 $B = (.015 * \text{SLTEIL}) + (.02 * \text{SGTIL})$
 $C = 144 * \text{CPI} * \text{YSV}$
- (21) $(.015 * \text{AAC5} * \text{YSV35}) - (.0143 * \text{PIA} * \text{YSV35})$
- (22) $A = [(.012 * \text{AMIN1}(\text{AAC3}, \text{IL3})) + (.015 * (\text{AAC3} - \text{IL3}))] * \text{YSV}$
 $B = 180 * \text{CPI} * \text{YSV}$
- (23) $A = (.01 * \text{SLTE5}) + (.015 * \text{SGT5})$
 $B = [(.0166 * \text{ECA} * \text{YSV20}) - (.45 * \text{PIA})] * \text{Y09}$
 $C = 1200 * \text{CPI} * \text{Y09}$
- (24) $A = (.01 * \text{SLTE8}) + (.01 * \text{SGT8})$
 $B = 60 * \text{CPI} * \text{YSV}$
- (25) $A = (.02 * \text{AAC5} * \text{YSV}) - (.75 * \text{PIA})$
 $B = 168 * \text{CPI} * \text{YSV}$
- (26) $A = (.0125 * \text{SLTE5}) + (.02 * \text{SGT5})$
 $B = 144 * \text{CPI} * \text{YSV}$
- (27) $A = (.0125 * \text{SLTE5}) + (.02 * \text{SGT5})$
 $B = .0167 * \text{AAC5} * \text{YSV}$
 $C = (.02 * \text{AAC5} * \text{YSV}) - (.015 * \text{PIA} * \text{YSV33})$
- (28) $[(.015 * \text{AAC5} * \text{YSV30}) + (.01 * \text{AAC5} * \text{YS3040})] - (.55 * \text{PIA})$
- (29) $.058 * (\text{AAC5} - \text{ILCA}) * \text{YSV}$
- (30) $(.02 * \text{AAC5} * \text{YSV30}) - (.0167 * \text{PIA} * \text{YSV30})$
- (31) $A = [(.01 * \text{AMIN1}(\text{AAC3}, 7200 * \text{CPI})) + (.015 * (\text{AAC3} - 7200 * \text{CPI}))] * \text{YSV}$
 $B = (.025 * \text{AAC3} * \text{YSV20}) - (.025 * \text{PIA} * \text{YSV20})$

- (32) $A = [(.0115 * AMIN1 (AAC5, IL51)) + (.014 * (AAC5 - IL51))] * YSV$
 $B = .013 * AAC5 * YSV$
 $C = (2100 * CPI * Y25) + (2700 * CPI * Y41)$
- (33) $A = [(.05 * AAC5 * YSV5) + (.011 * AAC5 * YSV630) + (.004 * AAC5 * YS3040)] - [(.05 * PIA * YSV5) + (.01 * PIA * YSV5P)]$
 $B = .02 * SE$
- (34) $A = (.0154 * AAC5 * YSV35) - (.5 * PIA)$
 $B = (120 * CPI) + (60 * CPI * YSV219)$
- (35) $A = (.015 * SLTE2) + (.016 * SGT2)$
 $B = (.0133 * AAC5 * YSV30) + (.01 * AAC5 * YS3040)$
- (36) $[(.0075 * AMIN1 (AAC5, 6000 * CPI)) + (.015 * (AAC5 - 6000 * CPI))] * YSV$
- (37) $A = [(.01 * AMIN1 (AAC5, IL5)) + (.015 * (AAC5 - IL5)) * YSV25] + (.005 * AAC5 * YSV25P)$
 $B = (.012 * SLTE1) + (.02 * SGT1)$
- (38) $(.05 * AAC5 * YSV10) - (.05 * PIA * YSV10)$
- (39) $[(.0033 * AMIN1 (AAC5, ILCA)) + (.0133 * (AAC5 - ILCA))] * YSV30$
- (40) $[(.0167 * AMIN1 (ECA, 9000 * CPI)) + (.0333 * (ECA - 9000 * CPI)) * YSV15] * Y09$
- (41) $A = [(.02 * AAC7 * YSV20) + (.005 * AAC7 * YS2040)] - (1212 * CPI)$
 $B = 40.56 * CPI * YSV40$
- (42) $(.0175 * AAC5 * YSV35) - (.0225 * PIA * YSV28)$
- (43) $A = (.02 * AAC5 * YSV30) - (.0222 * PIA * YSV30)$
 $B = .01 * AAC5 * YSV30$
- (44) $(.0145 * SLTEIL) + (.0225 * SGTIL)$
- (45) $A = (.02 * AAC5 * YSV25) - (.02 * PIA * YSV25)$
 $B = 240 * CPI * YSV$
- (46) $A = (.015 * AAC5 * YSV33) - (.5 * PIA)$
 $B = 84 * CPI * YSV35$
- (47) $(.01 * SLTE7) + (.015 * SGT7)$
- (48) $[(.02 * AMIN1 (AAC5, IL5)) + (.015 * (AAC5 - IL5)) * YSV35] * Y09$

- (49) $A = (.0075 * SLTEIL) + (.015 * SGTIL)$
 $B = 42 * CPI * YSV$
 $C = 960 * CPI$
- (50) $A = (.0167 * AAC5 * YSV30) - (.0278 * PIA * YSV30)$
 $B = 60 * CPI * YSV$
- (51) $(.0167 * AAC5 * YSV30) - (.0167 * PIA * YSV30)$
- (52) $A = [((.01 * AMIN1 (AAC5, 9600 * CPI)) + (.015 * (AAC5 - 9600 * CPI))] * YSV$
 $B = 48 * CPI * YSV$
- (53) $(.01 * SLTEIL) + (.02 * SGTIL)$
- (54) $(.01 * SLTEIL) + (.0175 * SGTIL)$
- (55) $A = (.0135 * AAC5 * YSV) - (.0125 * PIA * YSV30)$
 $B = .017 * SE$
- (56) $[((.013 * AMIN1 (AAC5, IL59)) + (.018 * (AAC5 - IL59))] * YSV] * Y09$
- (57) $A = (.012 * SLTE4) + (.02 * SGT4)$
 $B = (.0143 * AAC5 * YSV35) + (.005 * AAC5 * YSV35P) - (.0143 * PIA * YSV35)$
- (58) $(.02 * AAC5 * YSV25) - (.5 * PIA)$
- (59) $(.0075 * SLTEIL) + (.015 * SGTIL)$
- (60) $(.02 * ECA * YSV25) + (.01 * ECA * YSV25P) - (.833 * PIA)$
- (61) $[(.025 * AMIN1 (AAC5, IL5)) + (.0333 * (AAC5 - IL5))] * YSV15$
- (62) $(.0167 * AAC5 * YSV) - (.0125 * PIA * YSV)$
- (63) $[(.01 * AMIN1 (AAC5, ILCA)) + (.015 * (AAC5 - ILCA))] * YSV$
- (64) $[(.01 * AMIN1 (AAC5, 9000 * CPI)) + (.017 * (AAC5 - 9000 * CPI))] * YSV35$
- (65) $(.04 * AAC5 * YSV15) + (.01 * AAC5 * YSV15P) - (.0333 * PIA * YSV15)$
- (66) $(.0166 * E56 * YSV) - (.0222 * PIA * YSV30)$
- (67) $(.015 * AAC5 * YSV35) - (.0238 * PIA * YSV35)$

- (68) $A = [(.0115 * AMIN1 (AAC5, ILCA)) + (.014 * (AAC5 - ILCA))] * YSV$
 $B = .013 * AAC5 * YSV$
 $C = (240 * CPI * Y9) + (2100 * CPI * Y25) + (2400 * CPI * Y41)$
- (69) $A = [(.01 * AMIN1 (AAC1, 7800 * CPI)) + (.015 * (AAC1 - 7800 * CPI))] * YSV$
 $B = 72 * CPI * YSV$
- (70) $[((.0167 * AMIN1 (AAC5, 50,000 * CPI)) + (.017 * (AAC5 - 50,000 * CPI))) * YSV35] - (.0143 * PIA * YSV35)$
- (71) $(.019 * SLTE3) + (.0225 * SGT3)$
- (72) $A = (.0133 * AAC5 * YSV30) + (.005 * AAC5 * YSV30P) - [(.5 * PIA) - (5400 * CPI)]$
 $B = 120 * CPI * YSV30$
- (73) $(.0167 * AAC5 * YSV30) - (.0167 * PIA * YSV30)$
- (74) $[(.01 * AMIN1 (AAC5, 12000 * CPI)) + (.016 * (AAC5 - 12,000 * CPI))] * YSV$
- (75) $(.017 * SLTEIL) + (.021 * SGTIL)$

Definitions of Variables

Compensation Base Variables

- AAC1--annual compensation during last year of employment.
- AAC3--average annual compensation for highest three years.
- AAC5--average annual compensation for highest five years.
- AAC7--average annual compensation for highest seven years.
- CPI--consumer price index adjustment factor applied to flat dollar amounts for retirement years later than 1984.
- ECA--career average annual compensation.
- E56--average annual compensation from age fifty-six to sixty.
- SE--total career annual compensation.
- SE17--total annual compensation for last seventeen years of employment.

- SGT1--sum of annual compensation greater than \$3,000 X CPI for each year of employment.
- SGT2--sum of annual compensation greater than \$4,200 X CPI for each year of employment.
- SGT3--sum of annual compensation greater than \$4,800 X CPI for each year of employment.
- SGT4--sum of annual compensation greater than \$6,000 X CPI for each year of employment.
- SGT5--sum of annual compensation greater than \$6,600 X CPI for each year of employment.
- SGT6--sum of annual compensation greater than \$7,800 X CPI for each year of employment.
- SGT7--sum of annual compensation greater than \$10,800 X CPI for each year of employment.
- SGT8--sum of annual compensation greater than \$20,400 X CPI for each year of employment.
- SGTIL--sum of annual compensation greater than the Social Security taxable wage base for each year of employment.
- SG1LIL--sum of annual compensation greater than \$3,000 X CPI and less than or equal to the Social Security taxable wage base for each year of employment.
- SLTE1--sum of annual compensation less than or equal to \$3,000 X CPI for each year of employment.
- SLTE2--sum of annual compensation less than or equal to \$4,200 X CPI for each year of employment.
- SLTE3--sum of annual compensation less than or equal to \$4,800 X CPI for each year of employment.
- SLTE4--sum of annual compensation less than or equal to \$6,000 X CPI for each year of employment.
- SLTE5--sum of annual compensation less than or equal to \$6,600 X CPI for each year of employment.
- SLTE6--sum of annual compensation less than or equal to \$7,800 X CPI for each year of employment.
- SLTE7--sum of annual compensation less than or equal to \$10,800 X CPI for each year of employment.

SLTE8--sum of annual compensation less than or equal to \$20,400 X CPI for each year of employment.

SLTEIL--sum of annual compensation less than or equal to the Social Security taxable wage base for each year of employment.

Integration Level Variables

ILCA--career average Social Security taxable wage base.

IL1--Social Security taxable wage base during last year of employment.

IL3--average Social Security taxable wage base for last three years of employment.

IL5--average Social Security taxable wage base for last five years of employment.

IL51--average Social Security taxable wage base from 1951 to year of retirement.

IL59--average Social Security taxable wage base from 1959 to year of retirement.

PIA--primary insurance amount.

Employment Tenure Variables

YSV--total years of service at retirement.

YSV219--years of service at retirement greater than or equal to two and less than or equal to nineteen.

YSV5--years of service at retirement less than or equal to five.

YSV5P--years of service at retirement greater than five.

YSV630--years of service at retirement greater than or equal to six and less than or equal to thirty.

YSV10--years of service at retirement less than or equal to ten.

YSV15--years of service at retirement less than or equal to fifteen.

YSV15P--years of service at retirement greater than fifteen.

YSV20--years of service at retirement less than or equal to twenty.

YS2040--years of service at retirement greater than twenty and less than or equal to forty.

YSV25--years of service at retirement less than or equal to twenty-five.

YSV25P--years of service at retirement greater than twenty-five

YSV28--years of service at retirement less than or equal to twenty-eight.

YSV30--years of service at retirement less than or equal to thirty.

YSV30P--years of service at retirement greater than thirty.

YS3040--years of service at retirement greater than thirty and less than or equal to forty.

YSV33--years of service at retirement less than or equal to thirty-three.

YSV35--years of service at retirement less than or equal to thirty-five.

YSV35P--years of service at retirement greater than thirty-five.

YSV40--years of service at retirement less than or equal to forty.

Y09--equals zero if total years of service at retirement are less than ten, equals one otherwise.

Y9--equals one if years of service at retirement equal nine, equals zero otherwise.

Y25--equals one if years of service at retirement equal twenty-five, equals zero otherwise.

Y41--equals one if years of service at retirement equal forty-one, equals zero otherwise.

APPENDIX V

SUBSAMPLE OF ACTUAL NONINTEGRATED
PENSION FORMULAS

- (1) $A = (.018 * AAC5 * YSV20) + (.012 * AAC5 * YSV20P)$
 $B = 123 * CPI * YSV$
- (2) $336 * CPI * YSV25 * Y09$
- (3) $(60 * CPI * YSV30 * Y09) + (600 * CPI * Y9)$
- (4) $84 * CPI * YSV30$
- (5) $(.0133 * AAC5 * YSV30) + (.0083 * AAC5 * YSV30P) + (36$
 $* CPI * YSV)$
- (6) $A = .01 * SE$
 $B = (126 * CPI * YSV60W) + (168 * CPI * YSVA)$
- (7) $.02 * AAC3 * YSV30$
- (8) $36 * CPI * YSV$
- (9) $120 * CPI * YSV$
- (10) $108 * CPI * YSV$
- (11) $144 * CPI * YSV$
- (12) $3720 * CPI * Y09$
- (13) $.016 * SE * Y09$
- (14) $(6000 * CPI * Y25) + (6840 * CPI * Y41)$
- (15) $.02 * AAC3 * YSV25 * Y09$
- (16) $102 * CPI * YSV35$
- (17) $96 * CPI * YSV35 * Y09$
- (18) $296 * CPI * YSV30$
- (19) $120 * CPI * YSV30$
- (20) $(960 * CPI * Y09) + (42 * CPI * YSV * Y09)$

- (21) $.02 * AAC5 * YSV$
- (22) $150 * CPI * YSV35$
- (23) $144 * CPI * YSV$
- (24) $120 * CPI * YSV$
- (25) $240 * CPI * YSV35$
- (26) $.002 * SE$
- (27) $66 * CPI * YSV35$
- (28) $132 * CPI * YSV$
- (29) $A = .01 * AAC5 * YSV$
 $B = 144 * CPI * YSV$
- (30) $117 * CPI * YSV * Y09$
- (31) $42 * CPI * YSV40$
- (32) $192 * CPI * YSV$
- (33) $A = .005 * SE$
 $B = 288 * CPI * YSV$
- (34) $84 * CPI * YSV * Y09$
- (35) $(300 * CPI * YSV * Y25) + (370 * CPI * YSV * Y41)$
- (36) $72 * CPI * YSV$
- (37) $96 * CPI * YSV40 * Y09$
- (38) $138 * CPI * YSV * Y09$
- (39) $A = [(.011 * AAC5 * YSV30) + (.012 * AAC5 * YSV30P)]$
 $\quad * Y09$
 $B = 168 * CPI * YSV * Y09$
- (40) $.01 * ECA * YSV * Y09$
- (41) $108 * CPI * YSV30$
- (42) $(202 * CPI * YSV60L * Y09) + (205 * CPI * YSV50L * Y09)$
 $+ (211 * CPI * YSVB * Y09)$
- (43) $A = .0158 * AAC5 * YSV$
 $B = (170 * CPI * YSV15) + (189 * CPI * YSV1630) + (208$
 $\quad * CPI * YSV30P)$

- (44) $(270 * CPI * YSV10) + (282 * CPI * YS1120) + (306 * CPI * YS2135)$
- (45) $.01 * AAC5 * YSV$
- (46) $126 * CPI * YSV$
- (47) $168 * CPI * YSV$
- (48) $(.015 * AAC5 * YSV30) + (.0125 * AAC5 * YSV30P)$
- (49) $(57 * CPI * YSV30A * Y09) + (60 * CPI * YSV30B * Y09)$
 $+ (63 * CPI * YSV30C * Y09) + (66 * CPI * YSV30D * Y09)$
 $+ (69 * CPI * YSV30E * Y09) + (72 * CPI * YSV30F * Y09)$
- (50) $144 * CPI * YSV * Y09$
- (51) $391 * CPI * YSV$
- (52) $270 * CPI * YSV$
- (53) $.01 * SE$
- (54) $(.023 * AAC5 * YSV22) + (.003 * AAC5 * YSV22P)$
- (55) $399 * CPI * YSV30 * Y09$
- (56) $3300 * CPI * Y09$
- (57) $.0052 * SE$
- (58) $120 * CPI * YSV35$
- (59) $(60 * CPI * YSVC) + (72 * CPI * YSVD) + (84 * CPI * YSVE) + (96 * CPI * YSVF)$
- (60) $.005 * SE$
- (61) $84 * CPI * YSV$
- (62) $136 * CPI * YSV35$
- (63) $204 * CPI * YSV$
- (64) $140 * CPI * YSV30$
- (65) $.0175 * AAC5 * YSV$
- (66) $.015 * SE$
- (67) $360 * CPI * YSV * Y09$
- (68) $417 * CPI * YSV35 * Y09$

(69) $(353 * CPI * YSV10 * Y09) + (471 * CPI * YS1130 * Y09)$

(70) $144 * CPI * YSV * Y09$

(71) $900 * CPI * Y09$

(72) $210 * CPI * YSV20 * Y09$

(73) $A = [(.0116 * AAC5 * YSV30) + (.0126 * AAC5 * YSV30P)] * Y09$

$B = [(139 * CPI * YSV15) + (157 * CPI * YS1630) + (176 * CPI * YSV30P)] * Y09$

(74) $A = .012 * SLTE12$

$B = 72 * CPI * YSV$

(75) $A = .01 * AMIN1 (AAC5, 15,000 * CPI)$

$B = 102 * CPI * YSV$

Definitions of Variables

Compensation Base Variables

AAC3--average annual compensation for highest three years.

AAC5--average annual compensation for highest five years.

CPI--consumer price index adjustment factor applied to flat dollar amounts for retirement years later than 1984.

ECA--career average annual compensation.

SE--total career annual compensation.

SLTE12--sum of annual compensation less than or equal to \$12,000 X CPI for each year of employment.

Employment Tenure Variables

YSV--total years of service at retirement.

YSV10--years of service at retirement less than or equal to ten.

YS1120--years of service at retirement greater than or equal to eleven and less than or equal to twenty.

YS1130--years of service at retirement greater than or equal to eleven and less than or equal to thirty.

- YSV15--years of service at retirement less than or equal to fifteen.
- YS1630--years of service at retirement greater than or equal to sixteen and less than or equal to thirty.
- YSV20--years of service at retirement less than or equal to twenty.
- YS2135--years of service at retirement greater than or equal to twenty-one and less than or equal to thirty-five.
- YSV22--years of service at retirement less than or equal to twenty-two.
- YSV22P--years of service at retirement greater than twenty-two.
- YSV25--years of service at retirement less than or equal to twenty-five.
- YSV30--years of service at retirement less than or equal to thirty.
- YSV30A--years of service at retirement in which annual compensation was less than or equal to \$6,000 X CPI.
- YSV30B--years of service at retirement less than or equal to thirty in which annual compensation was greater than \$6,000 X CPI and less than or equal to \$6,999 X CPI.
- YSV30C--years of service at retirement less than or equal to thirty in which annual compensation was greater than \$6,999 X CPI and less than or equal to \$7,999 X CPI.
- YSV30D--years of service at retirement less than or equal to thirty in which annual compensation was greater than \$7,999 X CPI and less than or equal to \$9,999 X CPI.
- YSV30E--years of service at retirement less than or equal to thirty in which annual compensation was greater than \$9,999 X CPI and less than or equal to \$11,999 X CPI.
- YSV30F--years of service at retirement less than or equal to thirty in which annual compensation was greater than or equal to \$12,000 X CPI.
- YSV30P--years of service at retirement greater than thirty.
- YSV35--years of service at retirement less than or equal to thirty-five.

YSV40--years of service at retirement less than or equal to forty.

YSV50L--years of service at retirement if annual compensation in the last year of employment is greater than \$20,103 X CPI and less than or equal to \$20,540 X CPI, equals zero otherwise.

YSV60L--years of service at retirement if annual compensation in the last year of employment is less than or equal to \$20,103 X CPI, equals zero otherwise.

YSV60W--years of service at retirement if average annual compensation for five highest years is greater than \$11,600 X CPI and less than or equal to \$12,000 X CPI, equals zero otherwise.

YSVA--years of service at retirement if average annual compensation for five highest years is greater than \$16,799 X CPI, equals zero otherwise.

YSVB--years of service at retirement if annual compensation in the last year of employment is greater than \$22,298 X CPI, equals zero otherwise.

YSVC--years of service at retirement in which annual compensation was less than or equal to \$10,000 X CPI.

YSVD--years of service at retirement in which annual compensation was greater than \$10,000 X CPI and less than or equal to \$13,000 X CPI.

YSVE--years of service at retirement in which annual compensation was greater than \$13,000 X CPI and less than or equal to \$16,000 X CPI.

YSVF--years of service at retirement in which annual compensation was greater than \$16,000 X CPI.

Y09--equals zero if total years of service at retirement are less than ten, equals one otherwise.

Y9--equals one if years of service at retirement equal nine, equals zero otherwise.

Y25--equals one if years of service at retirement equal twenty-five, equals zero otherwise.

Y41--equals one if years of service at retirement equal forty-one, equals zero otherwise.

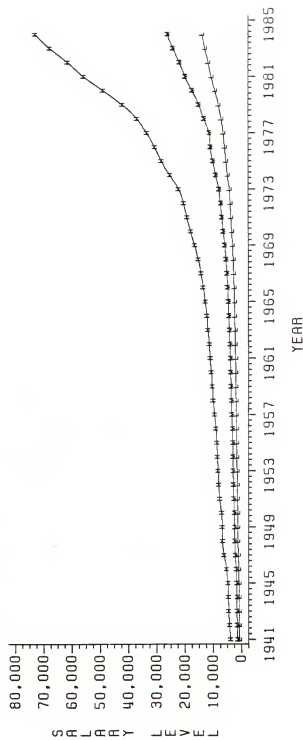
APPENDIX VI

LOW, MEDIAN, AND HIGH SALARY DISTRIBUTIONS FOR FOUR RETIREMENT YEARS

Retirement Year--1984

<u>Year</u>	<u>Salary Level</u>			<u>Year</u>	<u>Salary Level</u>		
	Low	Median	High		Low	Median	High
1941	\$ 735	\$ 1,379	\$ 3,861	1963	\$ 2,249	\$ 4,217	\$11,808
1942	813	1,525	4,271	1964	2,329	4,367	12,227
1943	863	1,618	4,531	1965	2,432	4,561	12,771
1944	878	1,646	4,608	1966	2,570	4,819	13,492
1945	915	1,716	4,806	1967	2,715	5,091	14,255
1946	1,011	1,897	5,311	1968	2,904	5,445	15,245
1947	1,176	2,206	6,177	1969	3,140	5,889	16,488
1948	1,292	2,422	6,782	1970	3,411	6,398	17,914
1949	1,305	2,447	6,852	1971	3,652	6,849	19,177
1950	1,344	2,520	7,056	1972	3,873	7,263	20,337
1951	1,477	2,769	7,755	1973	4,220	7,913	22,157
1952	1,539	2,886	8,081	1974	4,801	9,001	25,204
1953	1,582	2,967	8,307	1975	5,370	10,068	28,191
1954	1,622	3,041	8,514	1976	5,829	10,929	30,601
1955	1,652	3,097	8,672	1977	6,362	11,929	33,401
1956	1,713	3,213	8,997	1978	7,021	13,164	36,858
1957	1,814	3,401	9,523	1979	8,000	15,000	42,000
1958	1,904	3,570	9,995	1980	9,300	17,437	48,825
1959	1,962	3,679	10,300	1981	10,607	19,887	55,685
1960	2,037	3,820	10,696	1982	11,683	21,906	61,337
1961	2,103	3,944	11,044	1983	12,881	24,151	67,624
1962	2,174	4,076	11,414	1984	13,873	26,011	72,831

Retirement Year -- 1984

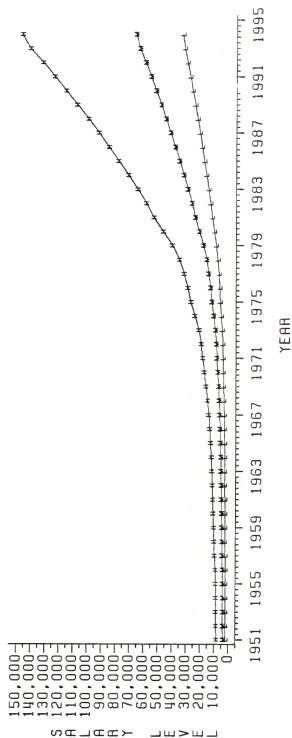


L-L-L = Low Salary Level
M-M-M = Median Salary Level
H-H-H = High Salary Level

Retirement Year--1994

<u>Year</u>	<u>Salary Level</u>			<u>Year</u>	<u>Salary Level</u>		
	Low	Median	High		Low	Median	High
1951	\$ 1,891	\$ 3,783	\$ 8,407	1973	\$ 4,769	\$ 9,538	\$ 21,195
1952	1,933	3,866	8,592	1974	5,401	10,802	24,004
1953	1,949	3,897	8,660	1975	6,041	12,082	26,848
1954	1,958	3,917	8,704	1976	6,557	13,115	29,144
1955	1,990	3,979	8,843	1977	7,157	14,315	31,811
1956	2,059	4,119	9,152	1978	7,898	15,796	35,103
1957	2,175	4,349	9,665	1979	9,000	18,000	40,000
1958	2,277	4,554	10,119	1980	10,462	20,925	46,500
1959	2,341	4,681	10,402	1981	11,932	23,865	53,033
1960	2,425	4,850	10,777	1982	13,144	26,287	58,416
1961	2,498	4,995	11,100	1983	14,491	28,982	64,404
1962	2,575	5,150	11,444	1984	16,005	32,010	71,134
1963	2,657	5,315	11,811	1985	17,550	35,099	77,998
1964	2,745	5,490	12,200	1986	19,103	38,205	84,901
1965	2,853	5,707	12,682	1987	20,698	41,396	91,990
1966	3,000	6,001	13,335	1988	22,385	44,770	99,488
1967	3,155	6,310	14,022	1989	24,142	48,284	107,297
1968	3,358	6,717	14,927	1990	25,940	51,881	115,291
1969	3,615	7,231	16,068	1991	27,743	55,487	123,304
1970	3,910	7,820	17,378	1992	29,616	59,232	131,627
1971	4,166	8,332	18,516	1993	31,615	63,231	140,512
1972	4,397	8,795	19,544	1994	32,880	65,760	146,132

Retirement Year -- 1994

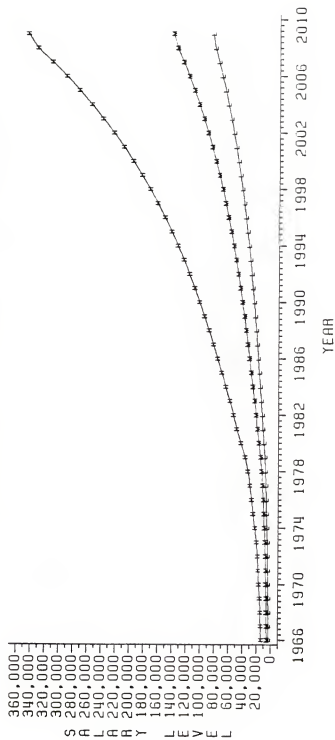


L-L-L = Low Salary Level
M-M-M = Median Salary Level
H-H-H = High Salary Level

Retirement Year--2009

<u>Year</u>	<u>Salary Level</u>			<u>Year</u>	<u>Salary Level</u>		
	Low	Median	High		Low	Median	High
1966	\$ 3,348	\$ 5,580	\$13,765	1988	\$21,490	\$35,817	\$ 88,350
1967	3,445	5,742	14,164	1989	23,070	38,450	94,843
1968	3,590	5,983	14,759	1990	24,789	41,314	101,909
1969	3,784	6,306	15,556	1991	26,511	44,186	108,992
1970	4,083	6,805	16,785	1992	28,301	47,168	116,349
1971	4,340	7,233	17,842	1993	30,211	50,352	124,202
1972	4,570	7,617	18,788	1994	32,251	53,751	132,586
1973	4,945	8,241	20,328	1995	34,428	57,379	141,536
1974	5,588	9,313	22,971	1996	36,751	61,252	151,089
1975	6,208	10,346	25,521	1997	39,232	65,386	161,288
1976	6,692	11,153	27,512	1998	41,880	69,800	172,175
1977	7,254	12,090	29,822	1999	44,707	74,511	183,796
1978	7,950	13,251	32,685	2000	47,725	79,541	196,203
1979	9,000	15,000	37,000	2001	50,946	84,910	209,446
1980	10,417	17,362	42,827	2002	54,385	90,641	223,584
1981	11,829	19,715	48,631	2003	58,056	96,760	238,676
1982	12,971	21,618	53,323	2004	61,975	103,291	254,787
1983	14,235	23,725	58,522	2005	66,158	110,263	271,985
1984	15,652	26,086	64,345	2006	70,624	117,706	290,344
1985	17,084	28,473	70,233	2007	75,391	125,651	309,942
1986	18,510	30,850	76,098	2008	80,480	134,132	330,863
1987	19,963	33,272	82,071	2009	83,699	139,498	344,097

Retirement Year -- 2009

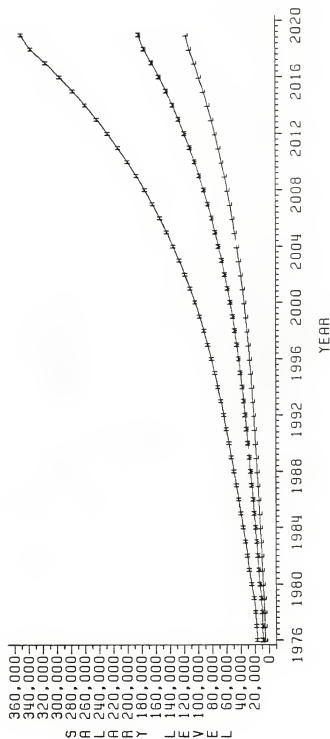


L-L-L = Low Salary Level
M-M-M = Median Salary Level
H-H-H = High Salary Level

Retirement Year--2019

<u>Year</u>	<u>Salary Level</u>			<u>Year</u>	<u>Salary Level</u>		
	Low	Median	High		Low	Median	High
1976	\$ 5,499	\$ 8,640	\$16,495	1998	\$ 30,523	\$ 47,965	\$ 91,571
1977	5,851	9,193	17,551	1999	32,431	50,963	97,294
1978	6,295	9,892	18,885	2000	34,620	54,403	103,861
1979	7,000	11,000	21,000	2001	36,957	58,075	110,872
1980	8,085	12,705	24,255	2002	39,451	61,995	118,356
1981	9,160	14,395	27,481	2003	42,114	66,180	126,345
1982	10,021	15,748	30,064	2004	44,957	70,647	134,873
1983	10,973	17,244	32,920	2005	47,992	75,416	143,977
1984	12,037	18,917	36,113	2006	51,231	80,506	153,696
1985	13,109	20,600	39,328	2007	54,689	85,940	164,070
1986	14,171	22,269	42,513	2008	58,381	91,742	175,145
1987	15,247	23,961	45,744	2009	62,321	97,934	186,967
1988	16,376	25,734	49,129	2010	66,528	104,545	199,587
1989	17,538	27,561	52,617	2011	71,019	111,601	213,059
1990	18,757	29,476	56,274	2012	75,813	119,134	227,441
1991	19,967	31,378	59,904	2013	80,930	127,176	242,793
1992	21,215	33,339	63,648	2014	86,393	135,760	259,182
1993	22,541	35,423	67,626	2015	92,224	144,924	276,677
1994	23,950	37,637	71,852	2016	98,449	154,707	295,352
1995	25,447	39,989	76,343	2017	105,095	165,149	315,289
1996	27,037	42,488	81,115	2018	112,189	176,297	336,571
1997	28,727	45,144	86,184	2019	116,677	183,349	350,034

Retirement Year -- 2019



L-L-L = Low Salary Level
 M-M-M = Median Salary Level
 H-H-H = High Salary Level

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BIOGRAPHICAL SKETCH

Julie Haney Collins was born in Gainesville, Florida, on July 27, 1957, the daughter of David Wesley and Sara Jane Haney. She entered the University of Florida in Gainesville, Florida, in the Fall of 1975. There she received a Bachelor of Science in Business Administration and a Master of Accounting in December of 1978 and 1979, respectively. In November of 1980 Mrs. Collins passed the Certified Public Accountants examination. She accepted employment as an Assistant Professor in the School of Accounting at the University of Oklahoma in Norman, Oklahoma, beginning Fall semester of 1983. She will receive a Doctor of Philosophy in business administration from the University of Florida in December, 1983.

Julie Haney was married to William Arthur Collins in September, 1979. They have one son, William James Collins, born on June 19, 1981.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope of quality, as a dissertation for the degree of Doctor of Philosophy.



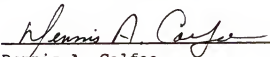
John L. Kramer, Chairman
Associate Professor of Accounting

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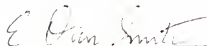
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Dennis A. Calfee
Professor of Taxation

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope of quality, as a dissertation for the degree of Doctor of Philosophy.



E. Dan Smith
Professor of Accounting

This dissertation was submitted to the Graduate Faculty of the Department of Accounting in the College of Business Administration and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 1983

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